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INDUSTRIAL-ARTS MAGAZINE

Vol. VI AUGUST, 1917 No. 8

TIMELINESS AND VOCATIONAL EDUCATION

Edna Bryner, Author of Reports on the Garment Trades and Dressmaking and Millinery, Cleveland Education Survey



OMEN today are faced with three activities: wage earning, housekeeping, and child rearing. Woman's place is three places and her immediate concern is to secure preparation to fill three places

adequately. In recognition of this situation, the recent vocational education movement, initiated in the belief that the public schools should train young people for their working life, has brought about an attempt to prepare girls before they leave school, both for their domestic career and for the wage earning interval. This means that between the ages of 12 and 16, besides rounding out her general education, the girl is supposed to acquire a technique of housekeeping, the rudiments of child care, and the elements of some sort of wage earning vocation.

Such a program staggers the imagination of those who know the adolescent girl and who realize the extent of the demands. The efforts of the average girl to follow the program results in a smattering of each subject. Complications arise from the encroachment of preparation for one activity upon preparation for another; and the only apparent solution seems to be the sacrifice of one sort to Most women, however, do not engage in the three activities at once, but in wage earning first, housekeeping second, and child rearing third, the last two continuing along together. They do not, therefore, need preparation for all three at once. Common sense points not to sacrifice but to the application of a sound principle: Training of any sort should be given at the time the person needs it.

It is an undisputed fact that the technique of any activity is the more readily acquired by those who have a pressing need or desire for it. In order to be entered for the tennis tournament a girl will spend hours of the most arduous labor practicing various kinds of serves and returns and will read all the helps on tennis playing that she can find. The person who is to travel thru France will drudge over the rudiments of the French language acquiring a vocabulary sufficient to enable him to find out the things he wants to know on his journey. The actuating motive in acquiring technique is without doubt need or desire to practice it in a special situation.

It is well known, moreover, that the technique of an activity vanishes quickly when it is not sufficiently used. The tennis player bemoans the fact that he has not picked up a racket for three years and has forgotten entirely the fine serve he once had. The French student who has learned enough of the language to converse and read fairly intelligently finds after two or three years of neglect in speaking and reading that he must sit down with grammar and dictionary and "learn all over again." Everyone has had similar experiences. Examples can be multiplied indefinitely. Common experience shows that it is poor economy to acquire a special technique several years before it is put to account.

The widespread belief that girls should acquire three special techniques besides rounding out their general education before they leave school appears in the light of the foregoing principles and in the light of facts concerning the time at which women enter upon the three activities to be indeed short-sighted. The majority of women enter the three activities but they do not enter the three at once nor do a great number engage in all three at once. To get the full measure of worth out of training for the different activities they should receive the instruction very near the time at which they put it into serious practice.

Women Engage in the Three Activities in Majorities.

The contention that preparation should be given to the girl hard on the heels of her entrance into each activity becomes a serious one in the light of the fact that the majority of women become wage earners as well as housekeepers and child rearers. This fact is hardly realized even by those who believe that wage earning, no less than domestic activity, is a factor to be reckoned with in the lives of women.

The United States census showed that in 1910 exactly one-quarter of all the women 16 years of age and over in the country were wage earners. This is the figure customarily accepted as denoting the extent of wage earning among women. The figure represents, however, only the number of women who were at work in 1910 at the time the census was taken; it does not show the number of women who go to work. The army of women workers is constantly changing. Women begin working at all ages. They stop working at all ages. Some work all their lives. Others file off, year after year, into the ranks of house-keepers and child rearers and their places are filled by those who have never worked before. Many enter the ranks of industry for the first time after

they are married or after their children are grown. The wage earning quarter changes its personnel so considerably from year to year that the total proportion engaging in this activity must be tremendously larger to maintain a constant proportion of 25 per cent.

The number of girls who are at work between the ages of 16 and 20 forms a more accurate basis on which to count the number of women who work; for the majority of women wage earners begin during the years immediately following the end of the schooling period. The census of 1910 showed that two-fifths of all the girls in the country between these ages were at work. In the cities the proportion was much larger. In the eight largest cities it varied from one-half to two-thirds, the average being about three-fifths.

This is the nearest actual figure which the census affords respecting the proportion of women who work; and while it comes closer to the truth it is doubtless much smaller than the actual per-It does not accurately represent even centage. the number who go to work between the ages of 16 and 20. It includes simply the girls between these ages who were at work when the census was taken in 1910; and takes no account of those who went to work before the age of 16 or at some time between the ages of 16 and 20 but who stopped before the census was taken after a few years' work. A conservative estimate places the proportion of girls who enter wage earning immediately after leaving school at from one-half in the country in general to three-quarters in the cities. Add to this the numbers of women who go to work after the age of 21; add also those who go to work after one census is taken and stop before the next one after from one to nine years' work and this estimate will be considerably raised.

There is no doubt but that the wage earning interval is inevitable in the lives of an increasing majority of women. The effect produced upon the country by having from one-half to three-quarters of its women engaging in gainful occupations is much greater than that which would be produced by having one-quarter work all their lives. Only by recognition of the fact that we are dealing with majorities in regard to the problem of training for the three activities can a satisfactory solution be worked out.

When Women Enter the Three Activities.

Girls enter wage earning in great numbers during those years immediately following the end of the schooling period; in household affairs they are recruited in relays each year extending over a long period of time. Wage earning occupies the attention of between twice and three times as many women during the years immediately after leaving school as housekeeping and child rearing. Available data show that 40 per cent of the girls from 16 to 20 years of age are at work, while only 18 per cent are married; and that only 26 per cent of women from 21 to 44

years of age are at work, while 72 per cent are married. This contrast of the proportions of women at work and married for the age periods for which comparative data are at hand shows somewhat roughly the nearness of the wage earning period and the remoteness of housekeeping.

These figures do not tell the whole truth, however, either about wage earning or housekeeping. They do not tell how many women enter wage earning or domestic affairs during the specified age periods but only how many were at work and were married at a given time. Somewhere between one-half and threequarters of the girls in the country, according to the estimate made earlier in the pages, go to work between the ages of 16 and 20; while less than two-fifths of them, according to census figures, enter upon marriage during the same period. There are unfortunately no data upon which to base an estimate of the number of women who go to work after 21 years of age; but there is no doubt it is much smaller than the number who go to work before 21. Between twofifths and three-fifths of the women in the country enter upon marriage after the age of 21. Slightly more than two-fifths of them marry between the ages of 21 and 30 and the remainder who marry enter into this status after the age of 30.

If one were to prognosticate the careers of the 14-year-old girls now in school he would say that less than two-fifths of them will marry and presumably engage in household affairs before the age of 21; while between a half and three-quarters of them will go to work at some time during this same period Somewhat more than two-fifths of them will enter domestic affairs between the ages of 21 and 30, from five to fifteen years after they leave school; and the remainder who marry will do so after the age of 30. In short, the majority of women enter wage earning before the age of 21; the majority enter housekeeping and child rearing after the age of 21.

The Present Situation.

Suppose there were a trade or business essential to the country, a trade which could be carried on efficiently by adult persons of average intelligence. Suppose the majority of boys would take up this trade after the age of 21 from five to fifteen years or more after they left school, in the meantime having been engaged in some other sort of work. Suppose someone conceived the plan of teaching this trade in the public schools to all boys when they were 14 years of age. What would be the reaction of people?

Would they not say: "What is the use of teaching boys at 14 what most of them are not going to have any use for for several years? Will boys be vitally interested in learning what they are not going to use for several years? How much of what they learn now do you expect them to remember

five years from now when they actually start to work at this trade?"

This is a theoretical situation for men; but it is exactly the situation for women in respect to the business of housekeeping. Why is it that there is such insistence on the teaching of household science to 12 and 14-year-old school girls the majority of whom will not enter domestic activity for several years?

The argument, and the only one, commonly advanced for the universal teaching of household subjects in the public schools before the end of the compulsory period is this: The public school has all the girls of the country under its tutelage up to the age of 14. Therefore it has a chance at all the prospective housewives and mothers of the country. If girls do not get household training while they are compelled to stay in school, many of them never will get it; for it is doubtful whether an appreciable number of girls would voluntarily attend training courses provided for them at maturer years.

It is true that the public school has a chance at all the girls in the country, or really three-quarters of them if allowance is made for attendance at private and parochial schools. It is also true that it is a question whether most girls would voluntarily attend courses provided for them at more mature years. It is so very doubtful, however, that the public schools can give to 14-year-old girls what they will need most as housewives and mothers that it seems as if greater gain might result to the country if only a part of these girls were properly taught at more mature years rather than all of them at 14.

Children under 16 can be trained to be good underlings in any kind of business, to do set tasks and do them well; but they cannot be trained to be high grade workers or executives. The great complaint against women in household affairs today is that they are incapable of acting otherwise than as underlings. The households of today need women of high grade productive and executive ability. It is as impossible to train young girls to be efficient in household affairs as heads or high grade workers as it is impossible to train them for their wage earning careers as head dressmakers or office managers.

The absurdity of teaching the intricacies of child care to the 14-year-old girls ought to be apparent to everyone. Most girls are not going to marry and have babies until after they are 21 years of age. Yet so strong a hold upon people has the idea of teaching girls in school what they are going to need sometime in the home that in one of the largest cities in the country an elaborate course in infant hygiene was being given while at the same time the demonstration was confined to girl babies, the members of the class being considered too young to know the conformation of a boy baby.

The argument that young girls should be taught

child care in order to relieve their mothers of this responsibility is a fallacious one. Child care, in all except the most external respects, is too delicate a matter to trust to the irresponsible, and rightly irresponsible, hands of youth. And youth is too delicate a period of growth to be loaded down with responsibilities with which it is not rightly concerned. A girl of 14 has no business with the intimate care of anyone's babies. That is the business of her mother or of a grown woman secured in her place. Any movement which tends to transfer the responsibility of child rearing from the shoulders of adults to those of young people is a step in the wrong direction.

The absurdity of trying to teach an adequate technique of housekeeping to girls long before they engage in it seriously ought to be just as apparent as the absurdity of teaching child care to girls long before they have children. The business of household care is a man-sized job and belongs to adult life. The adolescent girl can be taught how to perform a few household tasks, such as cooking and sewing, in an elementary fashion but she cannot comprehend organized household business. Six months of training from an adult point of view given at the time the girl is entering upon adult responsibilities thru marriage is surely worth more than four years of scattered training given to the young adolescent.

This discussion has brought out a further consideration in respect to the necessity of vocational education being timely. It is obvious to everyone that the girl will learn domestic activity more readily if she is about to engage in it; and that she is bound to forget the technique she has learned if she does not put it into practice for several years. Most important, unless training is given near the time at which the girl is going to use it, it is not likely to meet the requirements of her activities. The actual needs of the woman at the head of a household are so far removed from what the school girl of 14 can conceive, that it is next to impossible for even the most enthusiastic of educators to plan a course for the young girls which will meet any but the most elementary of her needs as a housewife.

If we are to face the problem of vocational education for girls with any degree of courage and foresight, we will provide, first of all, a timely training. We will make it possible for three girls out of four to secure adequate industrial information before they end their compulsory schooling for their guidance into the sort of wage earning occupation for which they seem best fitted; and to secure in addition specific training for their work if it is of such nature as to demand training. At the same time we will make it possible for the girls who are not going to work to start their training for household affairs in a fashion suited to their years. Most important of all we will make it possible for all girls and women to secure adequate training in the technique of household busi-

ness at any age at which they may need to prepare themselves for this work and additional short courses in various aspects of household activity after they have embarked upon their domestic career. Vocational education for girls will never fulfil its possibilities unless it is above all else timely.

The Relation of the William Hood Dunwoody Industrial Institute to the State of Minnesota

H. W. Kavel, Principal of Dunwoody Institute



HE spirit of the Dunwoody Institute can best be stated in this extract from the will of its founder, Mr. William Hood Dunwoody:

"It is my purpose and desire to establish and endow a school to be called The William Hood Dunwoody Industrial Institute wherein shall be taught the industrial and mechanical arts, giving special importance to the different handicrafts and useful trades, including as of special importance the art of milling and the construction of milling machinery, shall be given free to the youth of the city of Minneapolis and the State of Minnesota without distinction on account of race, color or religious prejudice, and to make such rules and regulations as may be proper or necessary for the admission of pupils to said school, always having in mind my wish that the benefits thereof be given to as many as practicable with the means in its hands."

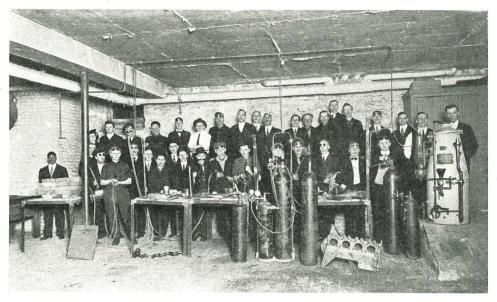
Mr. Dunwoody died in February, 1914, leaving about three and one-quarter millions of dollars for the establishment of the school. Mrs. Dunwoody's death followed that of her husband within a year,

corporated the school and started the first classes in December, 1914.

The school opened with about 80 boys in the day school and now has a total enrollment of over two thousand men and boys including day, evening, dull season, part time, teachers' and extension classes.

The trustees and school authorities are making every effort to carry out Mr. Dunwoody's wishes and give training in the industrial and mechanical arts to as many as practicable in the State of Minnesota.

Because of the terms of the will, the buildings will always be located in Minneapolis. The trustees have purchased a centrally located site facing the Parade Grounds. This site is three blocks long and two blocks deep and has the streets and alleys closed. The foundation is now in for the first two shops, which are to be 75 feet wide, 280 feet long, and two stories in height. The complete plans call for five shops of this width, 360 feet long, an administration building, an auditorium, a gymnasium, and a power house. This group of buildings will cover four square blocks when completed, leaving two blocks for athletic grounds and grand stands.



A CLASS IN WELDING.

and she added to his gift, making the total endowment of the school about five million dollars.

Mr. Dunwoody provided in his will for a selfperpetuating board of twelve trustees. This board is made up of Minneapolis business men. They inThe problem confronting the school now is how it can best serve the people of the state. Today out of an enrollment of 290 boys in the day school, 42 are from homes outside the city of Minneapolis. Many of the night school pupils are men who have

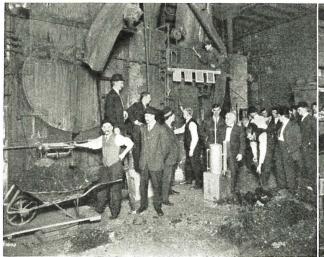
come to Minneapolis to work in order to attend evening classes. St. Paul has 110 men attending evening classes which are being carried on in that city by the Dunwoody Institute. There are 120 men enrolled in extension work in telephony thruout the state.

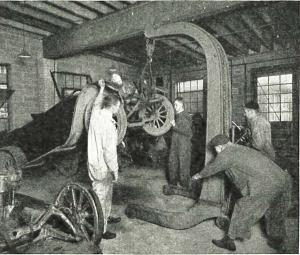
From these facts it appears that there are several ways of reaching ambitious young men in the state who want industrial training.

1. The All Day School. This means living in Minneapolis nine months out of the year for two years. Some students are doing this now. Some have relatives with whom they live; others work outside of school hours for either part or all of their room

two afternoons a week. In this case the pupil receives full pay from the employer while attending the school. A class of this kind is now in operation in the sheet metal trade.

- b. This plan is similar to the first except that the time is increased to two full half days in the school. The employer may pay for full time or require the boy to stand one of the half days each week.
- c. The two-boy plan provides two workers for the same job. One works while the other attends school, and they shift at the end of each week or each two weeks. In this plan the boys receive pay only for the hours they work.





Testing Boilers.

Automobile Repair Class.

and board. The school will probably soon provide a dormitory near the grounds so as to care for the physical and moral welfare of out-of-town students.

The day school is run on the productive shop plan. The students spend one-half day each day on the shop floor under practical shop men. Upon the completion of the two-year course students are entered in the trade under trade agreements as third-year apprentices, at a third-year apprenticeship wage, credit being given by the employer for the time spent in the school. The diploma of the school is withheld until the student brings back a report from the employer that he has satisfactorily completed a year's work in the trade.

- 2. Part Time Classes. These classes are of several types and are just in the making. Taken as a group they offer the greatest opportunity both from the standpoint of the school and the pupil. We believe that the student who gets real shop experience in the trade has an excellent foundation for the school to build upon. The part-time arrangement offers the student the opportunity of earning his way while learning the trade. Several types of part-time classes are under consideration.
- a. The plan where the boy goes to work as an apprentice and attends the school two hours a day,

The Dunwoody Institute hopes to organize many of these part-time classes, the type depending upon the conditions in the trade. The success of this method of offering the young men of the state an opportunity to earn and learn at the same time will depend largely upon the co-operation of Minneapolis employers.

3. Dull Season Classes. This scheme provides for all-day classes during the dull season in the trade. Last year a class for bricklayers' apprentices was carried on successfully during the months of January and February. The students spent one-half of each day in practical shopwork under a foreman bricklayer and the other half of the day in trade mathematics, trade science, drawing and plan reading. The course is laid out to cover three years and the pupil receives one-half his usual wage while in attendance at the school.

Dull season classes will be organized in other trades as soon as the school has the proper facilities for carrying on the work successfully.

In this connection it might be said that the Dunwoody Institute has under consideration a short winter course in farm mechanics for young men on the farms of the state. Such a course would not overlap or interfere with the work offered at the University of Minnesota, but would supplement it. We feel that in the application of electricity, concrete, wood and metal construction, gas engines, gas tractors, motor trucks, etc., to the farm, that the Dunwoody Institute can offer practical courses during the winter months that will be of great benefit to young men on the farm.

4. Evening Trade Extension Classes. At present the Dunwoody Institute is reaching the greatest number of students thru evening school instruction. Over 1,500 men are enrolled in 66 classes covering 24 different lines of work. These classes meet two hours a night, two nights a week, from October first to April first. The work is about equally divided between shopwork, shop mathematics and drafting.

The Dunwoody Institute does not believe that evening trade instruction can be carried on successfully in mixed classes. In the first place, unless a student has a background of trade experience upon which the school can build, he cannot get far in evening school work. The time the evening school is in session is entirely too short to attempt to teach a "green" man a trade. The idea of throwing a class open to both tradesmen and novices brings about a hopeless condition from the standpoint of the instructor. If he attempts to teach the men with trade experience what they need, his work will be beyond the green men. If he gives his attention to the elements needed by the novice, the tradesmen will not attend the classes. The Dunwoody Institute has, therefore, set up the requirement that only men actually engaged in the trade or a closely related trade will be admitted to trade extension classes.

- 5. Evening Classes in Other Centers in the State. At present evening classes are confined to Minneapolis and St. Paul and are possible largely thru the cooperation of the public school authorities in the two cities, who are sharing the public school buildings for the evening work. As the school organization is perfected, it is quite possible that evening classes will be projected to other centers in the state.
- 6. Extension Work to Small Groups. This year an experiment is being tried out among telephone workers thruout the state. The small group plan is this: In centers where more than four students are interested, one of the students is selected as a leader of the group. Lesson sheets and demonstrating equipment is sent to him and he acts as volunteer instructor. If this plan succeeds it may be extended to include other lines.
- 7. Correspondence Instruction. As in the case of the extension work to small groups in telephone work, an experiment is being carried on now in this same line where there are less than four students. Such instruction is being done directly by correspondence.
- 8. Trade Classes for Manual Training Teachers. Because of the development of prevocational work in



A Class in Bricklaying.

Minneapolis, there was an expression from Minneapolis manual training men for further training in some of the new lines that are being tried out in the junior high schools. The Dunwoody Institute is now carrying on these classes on Saturdays for manual training men in sheet metal work, electrical construction and printing. Should there be sufficient demand from the manual training men of the state for trade courses, the Dunwoody Institute is ready to open its shops and run classes for manual training teachers during the summer months.

- 9. Training Teachers in Service. The entire faculty of the Dunwoody Institute now numbers 76 men. The majority of these men either are holding or have held responsible positions in the trade. The Dunwoody Institute believes that a trade taught effectively must be taught by men who have been "thru the mill." Naturally but few of these men have had any training or experience in teaching. Before the opening of school short lecture courses were conducted for the instructors in both the day and evening schools. Thru these courses, thru conference and co-operation and thru experience gained on the job, the majority of the men are developing into successful instructors.
- 10. Short Unit Courses and Lesson Sheets. The system of dividing the work into short unit courses and using daily lesson sheets is working out nicely and is an effective method of getting the job done.

The short unit course offers the student in evening school an opportunity to come in at a stated time and get what he wants without having to go thru courses that he does not want. On the other hand, with these units arranged in progressive order a pupil may continue his studies for three or four years.

The lesson sheet prepared by the instructor and given to each student in advance of the lesson serves two purposes. It forces the instructor to analyze his problems and put down on paper what he proposes to teach. This does away with the old hit-and-miss method which was formerly often used in evening

school work. With the lesson sheet in advance, the student can be held for outside preparation which means greater accomplishment and a raising of the evening school standard of scholarship. A great deal of this lesson sheet material is being revised and will be published in pamphlet form.

11. Expert Services. The Dunwoody Institute also has under consideration the development of an expert service department. There are many men on the day and evening school faculty who are experts in their respective lines. Some of these men are frequently called in by employers and by schools to render expert service or to lecture. A department for this kind of service will probably grow out of these demands.

12. School Experiments. In addition to carrying on these different kinds of classes, the Dunwoody Institute is aiding financially in the carrying on of two experiments in the Minneapolis Public Schools. One is the Junior High School and the other is Home Gardening, both of which were started in 1916.

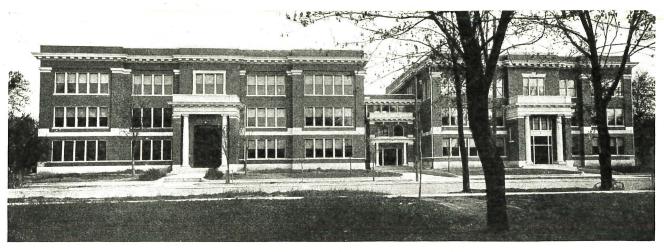
Qualifications of Students. Day school pupils must be 14 years of age and must have completed at least the seventh grade, except in the Printing and Electrical courses where they must have completed the eighth grade. Applicants who have completed

the eighth grade and who are more mature are given preference. Ninety-five per cent of the day students are eighth grade graduates or better. Many have completed two, three or four years of high school work. The average age of entrance is from 15 to 17 years of age.

The qualifications for part-time, evening, dull season and extension work classes are that the applicant must be employed in the trade and must be over 16 years of age.

All applicants must be residents of the State of Minnesota.

To sum up this statement on the relation of the Dunwoody Institute to the State of Minnesota, a favorable comparison may be made in many respects at least to the Extension Division of the University of Wisconsin. The Dunwoody Institute hopes to extend its services to ambitious men in the industrial and mechanical arts, to employers and to the schools of the State of Minnesota in much the same manner as the University of Wisconsin reaches the people in the State of Wisconsin in these and other lines, so that the benefits of the school reach as many as practicable. Such is the spirit of the Dunwoody Institute.



MANUAL ARTS BUILDING, WINFIELD, KANSAS.

The Manual Arts Building at Winfield, Kans., was erected to provide room for the increase in enrollment of the Winfield High School. The enrollment has grown from a few over three hundred, when the high school building proper was erected in 1910, to over six hundred at the time of the completion of the manual arts addition in the spring of 1917.

of the completion of the manual arts addition in the spring of 1917.

The Manual Arts Building was built as the new unit of the Winfield High School Building. The building is 90 by 100 feet, having three stories and a basement. The basement floor is to be used for forge rooms, cement work, cafeteria, janitor and supply rooms. The ground floor has a mechanical drawing room, a room for drawing and applied design, stock room, finishing room, director's office, two large joinery rooms, with locker rooms adjacent, and a machine room which is splendidly equipped with the most modern manual training machinery. The second floor is devoted exclusively to home economics. The sewing department has two rooms with a fitting room between. The kitchen accommodates 32 girls. Adjoining the kitchen, is the laundry. A unique feature of the building is the model apartment. This contains a large living room to be used for an emergency room for the girls, a dining room, bath room and kitchen. The third floor is devoted exclusively to physical training. On this floor is found the largest high school gymnasium in the state. It can also be used for auditorium purposes, since at one side is found a large stage. When used as an auditorium it accommodates two thousand. Ample dressing, locker and bath room facilities are furnished. The building complete cost \$75,000. The High School Building as a whole with separate heating plant cost approximately \$200,000.

KEEPING THE COPY-HOOK FULL

L. Day Perry, Supervisor of Manual Training, assisted by Roscoe J. Perry, Instructor in Printing, Joliet, Ill.



T is assumed, at the outset, that Printing is an unusually valuable branch of the industrial arts in the schools. The opportunity for correlation with varied subjects, both industrial and academic, is

practically limitless. Printing is second to none in the industrial arts courses in giving the boy an allaround opportunity for development, and in its tangible concrete results it undoubtedly ranks first. Differing from other branches generally, printing will keep a boy interested constantly. He may do varied work in the shop from cleaning the cases to cutting stock for the press. These varied activities in a measure account for his interest. Yet care must be taken to avoid too great a variety of activities in the shop for we may teach little more than a shiftless play activity unless we allow sufficient time for each operation; time enough for him to understand the processes and become relatively skilful in handling materials. Variety is the keynote to success in manual training in the elementary schools, yet there needs to be intensiveness in that variety that we may teach thoroly what we undertake. print shop is not a panacea but its distinctly commercial aspect and the many avenues radiating from it to varied subjects, together with necessary exactness within its confines, will change the average shiftless boy to one more or less alert. And more significant, he generally acquires a disposition to learn. However, all these desirable results are contingent upon good teaching both as regards methods and materials to print.

A print shop in the schools performs a distinct service not only in itself or to those fortunate enough to work within its confines, but to the entire student body thru the medium of printed matter. matter ordinarily would have to be dispensed with if the shop were not a part of the system, for the expense of such material acquired from commercial sources would prove prohibitive. And frequently such material is a practical necessity, yet unavailable. Printed forms of various kinds properly planned with those concerned, such as spelling lists, memory gems, animal forms, verse, and the like, enhance the productiveness and the concreteness of the work of the lower grades. Such matter is certain to increase efficiency and raise the standard of work of these grades, primarily thru the avenue of interest.

Generally speaking it is not good policy to print such matter as is conceded belongs to the commercial printer. Such matter would include stationery, payroll blanks, treasurers' reports, etc., for the executive department of the school system. It appears obvious, also, that no outside or commercial work should be undertaken, even the fully equipped for such jobs, without a distinct understanding with the commercial printers in the community. Even with these limitations the average school print shop may easily turn over to the board, in printed material, the equivalent of running expenses of the shop, and ultimately the original equipment cost. While this should not enter in any valid argument for the installation of a printing equipment it could be stated, where doubt exists, that a print shop pays for itself in a two-fold way,—pecuniarily, and in interesting boys in a practical medium.

What to Print.

Many who have print shops, and others planning printing equipments, raise the questions of "What shall we print?" and "Where are sources of material and copy?" The questions are even more pressing to those who must limit themselves to the printing of things educational, or at least to things non-However, rather should a question commercial. diametrically opposite to these two be asked, or, "Where shall we draw the line on printing from the mass of available copy?" Copy of the right kind should not be difficult to secure. The print shop which has difficulty in obtaining copy of a practical nature will find after a careful analysis of the situation, that there is something functionally amiss either with itself or the system.

There can be no valid excuse for dearth of material which makes it apparently necessary for the instructor to resort to pure "exercise" setting up. Setting up type in a stick for its sake alone, or for mere acquisition of skill and dexterity of hand, cannot be justified any more than can similar exercise work in woodwork. Work worth setting up is worth justification, proof reading, and running on the press. A very definite satisfaction and an element of pride is derived from seeing one's labors recorded in some permanent form. The gamut of operations from the news or job case to the drying rack, all of which he experiences in more or less degree, is a pertinent factor in the boy's development. There is no dearth of copy which may excuse any instructor in keeping boys before the cases setting and resetting type until certain dexterity results, or in insisting that the boys continue cleaning a press thoroly gone over by a preceding class, so they may understand that such cleaning is always necessary. Such unnecessary work is deadening to any boy; he acquires bad habits. In fact killing time in any shop indicates an intolerable condition of affairs.

Rather than a question of lack of copy the ques-

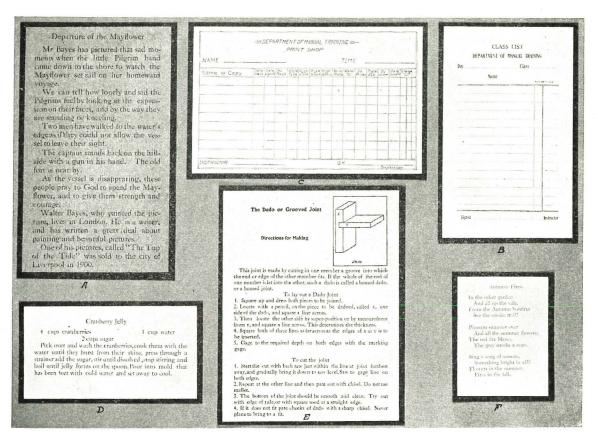


Plate 1.

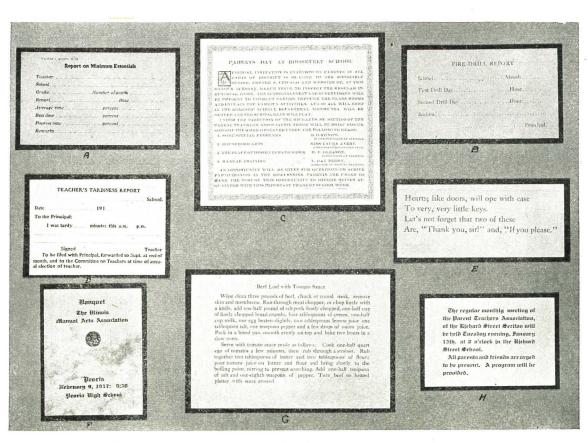


Plate 2.

tion should be one of selecting from the available material the kind suited to classes, as regards appropriateness and sequential arrangement. Skill may be acquired as readily thru setting up real jobs of value as from setting up type to be thrown back immediately into the cases. Every system with a print shop equipped in keeping with the community which it is to serve may easily keep it running at capacity, with worth while copy always available on the copyhook.

In the following illustrations no attempt will be made to elaborate to any appreciable degree the educational benefits to be derived from the printed used in the print shop. It is printed from a plate made from a line drawing. Sheet B is a class list used by every instructor to record the net amounts due from sale of materials in all shops. This is a ruled job which may be given advanced pupils only. Sheet E is one of many sheets used constantly in the wood shops giving full directions on the proper method of cutting joints. The isometric sketch is printed from a plate made from a line drawing in the drawing room. Sheet A describes the picture of the title indicated in terms that the pupil for whom intended may understand. These sheets describing the various masterpieces are printed in quantities

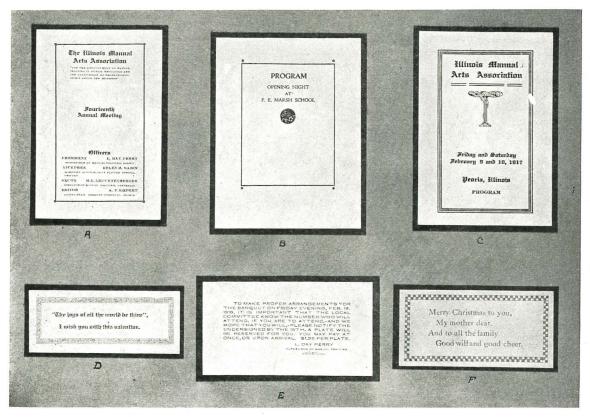


Plate 3.

material, either from the viewpoint of the classes which have a share in developing the product, or from that of the pupils or teachers who utilize the material in a practical way. A statement of the relative values derived will be considered sufficient. The illustrations are in no special order; there is no sequence. They merely indicate, in an incomplete way, the type of work which may be undertaken by elementary school boys, the character of material which may occupy a conspicuous place on the copyhook, and designate a standard of attainment for these grades. All printed matter is used in a very definite manner by the recipient. They are all practical and usable.

The Illustrations.

Plate 1 shows certain forms used constantly in the manual training shops. Sheet C is a copy record sufficient for every child in every grade. They are finally mounted in an art book bound by the pupil on a page opposite the Perry picture which it describes. At the end of each year each pupil has a book of several pictures with appropriate printed descriptions accompanying each. Thus does printing connect up with the art work in a definite manner. Here, alone, is an amount of work requiring very simple setting up, within the capacity of beginners. Sheet D represents one of the recipes used in the domestic arts department. All recipes are run on sheets uniform in size, being $6\frac{3}{4}$ " $\times 8\frac{3}{4}$ ". Each girl receives 24 sheets representing as many different recipes, in a year. These are bound in loose leaf form in a binding of their own making. At the end of three years' work in cooking each girl has 72 recipes, bound in a permanent form, which have been tried out in the school kitchen. Thus does the print shop connect up directly with the domestic arts in a very practical manner.

The sheet shown at C, Plate 2, is a two-color job; the border in brown and the type mass in green. The job shown in Sheet F is one which requires particular attention in proper spacing of lines, and furnishes opportunity for good design training. The remaining sheets on the plate are self-explanatory.

Plate 3 shows work which necessitates careful planning. The different sheets require proper placing of lines, careful spacing of the type masses, selection of appropriate borders. Two of these sheets, A and C, are run in two colors; the type body in black and

the border in red. The ornament in C is also red. Sheets B and C are covers for booklets.

Plate 4 illustrates cards of verse and of invitations. These all are very elementary in composition yet very effective. They involve an arrangement of line which necessitates a careful initial lay-out on the part of the worker. There is no place where two dimension designs may be taught to better advantage than in printing. Of necessity the size of the sheets on many of the plates is reduced to assure proper placing on the plates, so that the relation of the type mass to the borders is not always properly represented.

Plate 5. Sheet A shows a form made up with brass rule and typo-tabular squares. These squares are relatively new on the market and make jobs of

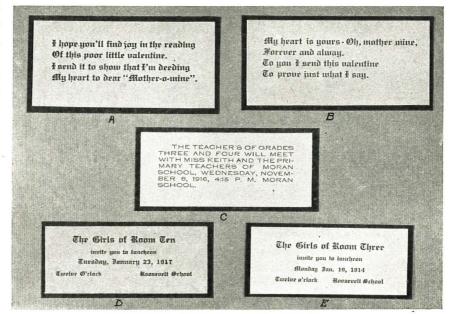


Plate 4.

the kind illustrated rather simple to set up, thereby making it possible for the advanced boy in the print shop to do such line work. The illustration is the reverse of a card used daily by the instructors in the department of household arts.

The illustrations shown on the various plates are merely indicative of the forms and kinds of work which may be undertaken by the boys in elementary school print shops. They in no wise exhaust available copy. Any live instructor may, after proper reference, detail material which is of direct benefit and assistance to the pupils, teachers, and officers of the entire school system. The print shop is a vital factor in providing aids in the manual arts particularly. In fact it may be used to bring about a closer

articulation between the various departments of the school system.

Classes.

In our printshop the great majority of classes are of the sixth grade. Several classes of seventh and eighth-grade boys also are in the printing classes. In some instances classes run more than one term, but generally in such instances a majority of the members of the class desire to do advanced work in printing. All classes run for a period of two and a half hours once a week. Many boys have especially asked that they be permitted to continue work for several terms, and wherever the demand is compatible with all interests such permission is granted.

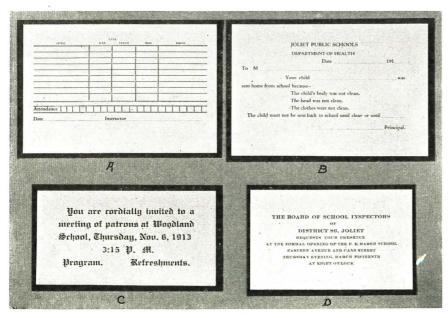


Plate 5.

Thus a boy with training may work with a beginning class, and generally he gives valuable assistance to the instructor and the new class because of his previous experience. It is really sound pedagogy to have an experienced boy in each class of beginners in the printshop. Naturally the beginners in the shop set up, justify and run nothing but straight matter. Jobs requiring particular spacing and lay-out, and border and brass rule are given to advanced boys and to those who may show particular ability in their work.

More or less controversy has arisen between the printshop instructors regarding the proper number of pupils in printing classes to assure maximum results as regards progress and productiveness. must be conceded that the boy in the printshop needs individual attention; a certain amount of composition only may be done up to the point of tying up type; the gamut of activities is unusually great; in fact the very nature of printshop procedure precludes large classes. Experience will demonstrate that a maximum number of ten or twelve in a class is about right, and that where this number is increased appreciably much injustice is done the boy, the instructor and the system generally. Many may advance the argument that the small number will make the per capita cost of the printshop much higher than the other branches of the industrial arts system. While the argument is not a valid one it may be refuted by the statement that the printshop turns back into the schools the difference in a pecuniary way. Further, its work is of such a far reaching, helpful nature in the shops, the classrooms, the executive offices and elsewhere that the bare figures of expense may be entirely discounted. The class of ten, with the group working constantly and in rotation, is ideal and proper.

Each boy in the class is given opportunity to experience the various activities in the class; he is not kept at the cases until he loses interest. He is shifted from one operation to another so that the work does not become monotonous and deadening. Naturally, he is kept at one operation long enough for him to understand the fundamentals of that operation; the change to other operations is made advisedly.

Equipment.

The question of equipment is an important one. It must be large enough to take care of the system which it serves. The full copy-hook has no significance if the equipment cannot take care of the copy. Much is thereby lost thru under equipment. Much valuable work must therefore be dispensed with because of lack of intelligent buying. There can be no justification for the practice which makes for "minimum equipments." The question is one requiring careful planning. Equipment large enough to carry on the work of a given field effectively and efficiently, should be the rule. With a well planned equipment, and a copy-hook filled with copy in sequential order, the printshop becomes a vital and necessary factor in any school system of value.

The Standardization of Manual Training

Milton Clauser, Director of Manual Arts, Salt Lake City, Utah



OME years ago, this subject, "The Standardization of Manual Training," would have called up the picture of a row of abstract joints. A little later it would have suggested a graded course of se-

lected tool exercises. At another time it would have conjured up a vision of evolutionary development a scheme which considered it essential that the child evolve again by living over the experience of the race from the stone age to the 40-centimeter-gun age. Then again, this subject would have hinted correlation with every subject in the curriculum from the capital R's thru the foolish fads down to the ridiculous fancies. Then comes a conglomerate picture of school repair shops, factory methods, short courses in "Jack of all Trades" followed up by a number of ultra-utilitarian courses forced upon manual training departments by educators who were more sinned against than sinning and who, in turn, were spurred on, on the one hand by men more interested in self-advertising than in genuine manual training, and on the other by men who were more interested in the preparation of factory hands than in the education of children. This nightmare of moving pictures can not do otherwise than make us feel that in a good many cases while the teacher was testing models, the child was lost under a stack of useful product. Where material can be found for such a rapid succession of movements it surely cannot be said that the subject lacks educational content. And the very fact that these movements have all occurred in forty years would suggest some live wires somewhere. However, if anyone came here with the thought that from this motley of motives, material and methods, I should attempt to pick out some one narrow line as "The Course" you will be disappointed.

I have already suggested the harm that has come from extreme enthusiasts and theorists. Yet most of the aforementioned systems of manual training have enriched the work in some way.

The Abstract-Joint System was a very effective way of teaching, in a limited time, a variety of fundamental tool processes. There are a very few of

these basic exercises that perhaps can be better taught by this method than by any other. This system developed skill but no initiative. It lacked interest in that it was correlated with nothing in or out of school. It was of some use to woodworkers but did not greatly benefit the engineering courses which hung on to it longest. It had a wilting effect upon students and a fossilizing effect upon the teachers. Its long life, like that of the turtle's, was due, not so much to its virility as to this external ossifying process which made it proof against all outside influences. Like a good many other subjects and methods it held its place mainly thru tradition and the ease with which it was taught. It was, as someone said, a classical course in wood taught by classical teachers in a classical way.

In the grades the Abstract-Joint System was replaced at a very early date by a hyphenated Swedish-American system known as the Sloyd System. This was a well thought out and systematic educational scheme which, later on, was opposed most by those who understood it least. Sloyd primarily aimed at the development of the child. It claimed a more logical sequence of models in that it was based upon tool exercises and interest rather than upon joints. Sloyd introduced the finished object, the useful project, the correlated drawing course and the pedagogically trained teacher. And with the introduction of all these ideas it never lost sight of the child to the extent that some later movements have.

Slovd fell into disrepute rather because the strain ran out than because of any inherent weakness. The supply of Sloyd trained teachers was not equal to the demand. The original body of men and women sent out from these schools, mostly to normal schools, were well prepared. But the adulteration and dilution of the Sloyd spirit that came with the second and third generation was its undoing. The teachers failed to adapt it to American life and conditions. They bought Swedish tools, used them in Swedish ways to make Swedish models. Tho the models had names, because of their Swedish nature, many of them were just as abstract to American children as those in the Abstract-Joint Courses. In design they were inartistic almost to the point of being clumsy. The system had a too fixed course of models and failed to develop initiative.

As a protest against the weakness of both the Abstract-Joint System and the Sloyd System a wave of reform swept over the country which came to be known as the Individual Initiative System.

The Individual Initiative System was a protest against the old order of things not only in the manual training courses but also in the academic courses. It might be called the morning star of a new educational evolution. In places where this individual initiative was kept within bounds and supported by progressive toolwork, correlated with the mechanical

drawing and design, there resulted the best manual training that this country has seen. While this movement brought as great a good as any of the waves that had swept the country, under it I have also seen some of the most abominable manual training I have ever come across. This was the beginning of extremes. In a good many places the system went the limit on one bound. It not only did away entirely with abstract joints and Swedish models but also with the fixed course of models and the graded exercises. Here now, for once children could make what they pleased. And the results usually did not live to tell the tale. But what did that matter; the public and educators were pleased. The boys were busy and worked as they never worked before—for a time. But when they lost interest after the novelty of the use of tools was worn off and would have no more of it, and the public refused to see anything in work that resulted in abominable designs, poor workmanship and equally poor finishes, educators were at a loss what to do. New movements were now in demand. Someone hit upon the idea that evolution should be recognized by the manual training courses. And, as if henceforth children were all to be Methusalehs, good historical subject matter was transferred to the manual training department. I heartily agree that we should recognize evolution in educational work. But, as for me, I can not see that it helps evolution or history or manual training to have children reconstruct in a crude way all the implements and processes of the past ages used in an industry in order that they may understand that industry. I do not believe it essential that children evolve again.

About this time correlation received an inning. Here was a splendid and most helpful idea. But instead of correlating the handwork with the related subjects of design, mechanical drawing, freehand rough sketches, and arithmetic it came to mean that manual training should be correlated with every subject in the curriculum and a number out of it; but no subject was correlated with manual training. To such an extent was this true in places that correlated manual training deteriorated into an advertising scheme for Audubon societies, women's clubs, civic improvement associations and the making of projects for other departments many of which had no educational value whatever.

Let me say here that things made for the school, under certain conditions, are the very best manual training projects. The harm comes in forcing them upon a class in overdoses and at inopportune times. It is a waste of the boy's and the teacher's time to attempt decimal fractions or mortise-and-tenon joints before the boy is ready or to have boys spend months on decimal fractions or making book-shelves after they have ceased to be of educational value.

The making of some bird houses may be a most

excellent thing, but we should not lose sight of the fact that the better the bird house from a nature study standpoint, the poorer it usually is from a manual training standpoint, and vice versa. A fly trap or a bird house may be an admirable project for certain grades, but for a whole school to make them during classtime every spring may be consistent with nature study and civic improvement but it is not good manual training.

There is a splendid opportunity to cultivate community spirit by making projects, either individually or in groups, for the school or community. But manual training teachers sometimes find themselves unequal to the occasion of creating the community spirit for an entire community. In such cases the boy considers community spirit a punishment for efficient work. I have had boys come to me with tears in their eyes and say: "Can't I make something for myself, just once? I have been working all year for the principal and teacher. The boys who do poor work can work all the time for themselves." And if to this is added inappreciation by an over-academic teacher you can imagine how it feels.

The useful cults under various aliases now put themselves forward more than ever before. There were the large model advocates who judged things by their size. Should a class lay a few square yards of cement sidewalk it would receive very little notice, tho the boys had learned about all there was to learn in the laying of cement sidewalks. But if another school should lay a cement sidewalk around the block it would be advertised all over the country. The fact that the first group may have been taught half a dozen other equally useful things the while the second group were being deprived of very valuable school time is often overlooked.

Again; one boy makes a small medicine cabinet of fine design having panelled doors and good finish. Another boy nails a few boards in opposite corners of the schoolroom and hangs, perhaps rather poorly, a few millmade doors to them for cupboards. The principal, who is a large model advocate, praises these cupboards to everyone who will listen, while the boys and teacher throw up their hands and say, "What's the use if that is the kind of work that receives recognition?"

No sane educator would object to the making of anything because it is useful. But there is such a thing as ultra useful courses. To a fifth or sixth grade boy a windmill, toy furniture, a drawing set or even an abstract exercise may be most useful, while bookshelves and picture frames, for a teacher he does not like, may be an abstract joint. A boy surely has some rights, and one of these is being a boy while he is a boy. I am not contradicting myself. A boy has spent fifteen or twenty minutes in trying to blockplane the end of a board. I tell him that if he practices faithfully for twenty minutes on scrap-

wood, a way I will show him, I will guarantee that he can knife line, saw off and blockplane such an end in less than three minutes; then that abstract exercise becomes a most vital and useful project. We find some more of these ultra useful courses where pupils of elementary grade were receiving specific training for particular jobs they wished to get. Such courses were plainly not made for the best interest of the pupil, but to make child labor more immediately profitable to employers.

With the investigation into the causes of retardation manual training received a new impetus. Sane educators saw, more and more, the real value, and consequent educational possibilities, of the industrial subjects. They felt that since the curriculum was so largely made up of academic subjects, where the work was of sound educational value, and was given for this purpose, manual training had a more than ordinary value in holding children in school.

However, if manual training is given merely as a bit to keep the retarded boy for a few years more at the academic subjects, I fear it will meet the defeat that follows deception. But, if it is given as a means of culture to develop the "hand minded" boy to whose best development thinking in things is essential, I would suggest that these boys be not taken out of these industrial classes, thru which they have learned to see the light, for the sake of making up the academic studies they could not or did not get.

There are some who would have manual training, or perhaps I should say prevocational training, "introduce a great variety of experiences" or fundamental operations from different trades, regardless of the time devoted to the work, in order to assist pupils in a choice of vocation. Introducing a great variety of experiences from different trades is a rather doubtful experiment when one stops to think that one and onehalf hours a week in reality means about 38 hour days in four or five years, especially so also when we realize, as William Matthews says, that "Up to the point of efficiency, when one is learning a trade or profession, there is comparatively little joyousness in one's labor." Some mastery in one trade will enable a boy to make a more intelligent choice, even in regard to other trades, than the very superficial knowledge he can gain in thirty days, stretched out thru four or five years, of a number of trades.

This prevocational idea has its good points, but like so many of the movements I have already referred to, I fear it will lead to some more extremes.

After all sorts of minor aims, motives and methods under a confusion of names, but all considered as a sort of manual training, had served their time, manual training had come to have such a reputation that, in some places in the East, if you are wise you will not mention the name. To interpret correctly the manual training situation it is essential to bear in mind that men who have inspected the work in all

parts of the country say that very many of the manual training courses of the West have more vocational content than many of the vocational courses of the East. This, quite likely, is the reason Dr. Snedden put manual training in his right column, as belonging to those studies that have only an appreciative value.

This brings us to the present day movement which we might call the Vocational School movement. This means so many things to different people that it would require a book to explain it in all its bearings. While it is generally agreed that vocational education should not be attempted below the high school there are some who would begin it, or work termed prevocational education, in the grades. Vocational education was primarily a protest against poor manual training, but it very soon came to mean more than this. It is a plea that those entering industrial life have just as much a right to an education adapted to their future needs as those entering the professions. There are some who would have this vocational school a department of the general high school. They would have pupils take their academic subjects with the academic classes and their technical subjects in the mechanic arts department. Others say schoolmasters, accustomed to general education, find it difficult to forego the opportunity to force pupils, to overload with general education to the detriment of their opportunities for vocational education. This influence makes itself felt thru suggestion, advice and programs built around academic courses; often perhaps unconsciously, but it is there. They also hold that, for pupils entering the industries, the academic subjects need a different emphasis if not content, from that which is needed for the professions. Hence we have advocates of separate vocational schools in which the general education shall be built around the vocational courses. Whether separated from the high school or not, in real vocational courses the shop courses are the majors, other related subjects the minors. In a technical school, the scientific and mathematical courses are the majors and shop courses among the minors, while in manual training courses they should be on the same footing.

If industrial work is to take its place in the curriculum alongside of that of the other studies it must be given some standing. Mere talk as to the value of industrial training will count for nothing when, by our actions, we treat these subjects as if they had no value. Proficiency or failure in these subjects should influence a pupil's standing in like manner as do the credits in any other subject.

The content, the cultural value and the utility of the industrial subjects are such as to give them an estimable place alongside of any of the academic subjects. And where the results are unworthy of recognition there must be something wrong with the nature of the work, the teaching or the conditions under which the work is done. Let us improve the first two, but let us also remove this handicap of the lack of recognition, a handicap under which those subjects could hardly hold their own, that have the force of years of tradition back of them. We hear on all sides that the curriculum must be enriched by these industrial subjects. Either the industrial subjects are worthy of recognition in promotions or all this talk of enriching the curriculum and adapting it to community needs is more or less of a contradiction.

This is not a plea for marks. For I agree with Supt. J. H. Francis of Columbus when he says, "Report cards, such as are handed to children at stated intervals with averages in their several studies marked thereon, are educational barbarities." The marking system harms both the bright and the dull boy. The dull boy it very often drives out of school, while the failure of bright boys in after life, of which you hear repeatedly, is due more to this false standard of comparing bright boys with mediocre boys than to any other one thing. The bright boy's 95 per cent when compared with the common lot is very often but 25 per cent for him when compared with what he should do. And as long as teachers and parents consider him a 95 per cent boy, of little avail is the suggestion that he must not compare himself with the Jones boy.

Manual training is not asking any special advantages. It does not need them. It merely asks that now that it has proved its worth it receive recognition. We are living in an age of a multiplicity of occupations. But out of all this multiplicity of interests the schools often select less than half a dozen which they consider of major importance. Failure in one or two of these subjects he may not need prevents a child from receiving his future rights to the studies he wants and needs. How many prospective geniuses in the line of music, art, invention, industry, etc., have had the life crushed out of them by this false educational standard which made them believe they were of no account if they failed in one of these minor "major subjects."

Why not replace this negative standard which considers a boy a failure, if he is weak in one of a few subjects, by a standard that will consider him a success if he can do well any equal number of subjects? I should even go further and say to the pupil who lacked one subject, if you can prove to us that you can do any worth while thing well;—play the piano or violin, keep house or bake bread, raise chickens, hogs or potatoes, show superior abilities as a salesman or artist, we will pass you to the high school. It is not marks but equal recognition for the special subjects that we want.

And with this standardization let us regard the teachers of this work as an important part of the school system. Let us demand of the training schools that they send us teachers with a broader outlook, teachers whose main interest will be centered in the child rather than a finished product. Let us have teachers who will put more effort in showing how to accomplish and less on testing models, who will think more of efficient habits of work and less on showy products, teachers who know and can teach a few related subjects rather than teachers who have a smattering of a large range of subjects and can teach none. Since there are so few schools giving degrees that have mapped out definite and efficient courses for preparing teachers for the various lines of industrial training, I would recommend that we initiate a system of certification that will encourage

experienced applicants regardless of degrees, and that will eliminate all applicants whose mastery of technic is limited to a "hatchet and saw" knowledge of rough carpentry even tho they hold a degree. Technic and teaching ability are the two chief factors to be considered.

A talking acquaintance with the course of study in manual training on the part of the grade teachers would have a tendency to create an intelligent appreciation of the work in the community or would put manual training teachers in that healthy state of aggravation that an eastern teacher found himself in upon his inability to give a reason for his teaching a certain thing when the superintendent said, "Either find out, cut it out or get out."

CLAY BUILDING

W. G. Whitford, Assistant Professor of Industrial and Esthetic Education, University of Chicago

(Second Article)

DECORATIVE PROCESSES: INCISING.

I

NCISING is a phase of applied design which comes under the head of surface enrichment.

It offers great possibilities to the student of decorative design and is employed more than any other process in public and art-school pottery decoration.

The character of pottery, with a surface which is easily modeled and carved before firing, makes this method a natural and consistent one. We find that it was the method most used by primitive people, who scratched, scraped and carved exceedingly beautiful patterns in the clay. It is also the method by which some of our most admired modern pottery is made.

Incising offers an opportunity for application of motives developed in the design class during the study of symmetrical units, borders and decorative

Shapes with varying proportion between height and width.

2:2 2:3 2:4 2:5

Fig. 6.

composition, but consideration must be given in the design room to the manner in which this ornament is to be applied. Limitations of tools, processes and materials must be recognized at the beginning of the design problem so that consistent and logical ornament for application may result.

The essential function of surface ornament is to add interest to construction. It never should be such as to destroy the contour or interfere with the utility of the piece.

Applied decoration should be composed upon lines which will adapt themselves to the lines of the form upon which it is to be placed. As this type of design is usually applied to the finished, but unfired, piece, the first consideration will be that of the piece itself, its form and proportion.

Proportion is one of the most important qualities of pottery design, for no matter how good the applied design, it will be spoiled if placed upon an ugly piece.

If the object to be built is an upright piece like a pitcher, stein or vase, we must first decide upon the best proportion between the height and the width. The best way to determine this is by experimentation, for no rule can be given. Nearly all shapes and proportions have use and beauty. By starting with a square and drawing vase forms in several rectangles as illustrated, Fig. 6, a good example of the best proportion for any particular case can be obtained. The same method can be used for bowls by drawing the rectangles in the horizontal position.

The second consideration is that of the line or curve between the top and the bottom. This offers great variety. Almost any curve will be satisfactory if it is graceful and well proportioned. The upper and lower halves should vary, however, otherwise the piece will be divided half and half, and will lack

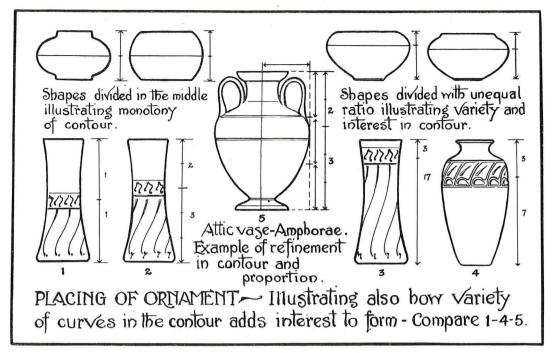


Fig. 7.

variety and interest, Fig. 7. The proportion of a piece is best which divides the upper and lower parts into a ratio which is not too similar on the one hand or too extreme on the other. A piece is divided into top and bottom by a line marking its widest part. Ratios of two to three, three to five, or five to eight are good types for the beginner.*

The remaining consideration is in the placing of the design. No definite rule can be given for the proper proportion to be used in placing ornamentation. Generally a border or the center of interest of a decoration is best when placed so as to accent the top, but it should be placed far enough from the top to give an interesting variety between the space occupied by the design and the remaining space of the

*See Industrial-Arts Magazine: Varnum, Industrial-Arts Design, Chap. III, March, 1915. vase. Figure 7, which shows the placing of the zone of ornamentation, illustrates clearly that no definite rule can be given covering this point. In example 1, the design divides the piece half and half and is thus very poorly placed. In example 2, even the the spacing is in the ratio of two to three, the design is poorly placed, while in example 5 the spacing is in the ratio of two to three and is perfectly arranged. The designs in examples 3 and 4 are well placed.

The only feature approaching a rule in this case is that the point of greatest curvature in the contour remains undecorated. Any decoration at this point seems to exaggerate the curvature and destroy the subtilty of the curve.

Many rules and theories are given but in practice design fails to confine itself to mechanical ap-



Fig. 8. Incised Ornament, College of Education, University of Chicago.

plication of rule. A designer must be trained in the principles of good art, must possess a feeling for fine curves and good proportion, must know his tools, materials and processes, and most important of all he must possess and use common sense.

Pottery design must be suited to the character of soft, plastic clay. Other mediums and processes such as we find in wood, metal and stone working, china painting, etc., must not be confused with pottery design.

The problem of decoration, construction and function or utility must be developed in mutual understanding and agreement so that there will result a harmonious unit of both use and beauty.

Having completed the foregoing considerations, we are ready for the design application.

For this process, the piece should be dried to a condition known as "leather hard." It should be hard enough so that it can be handled without injury to the shape, and soft enough to take a tool impression easily.

The piece is first placed upon the whirler and the horizontal lines marking the zone of enrichment and all horizontal lines within, drawn with a compass or a tool held rigid against a "rest" so as to mark the piece as it revolves.

The distance around the piece is then measured with a tape or long strip of paper and the number of repeats of the motive determined. This band or zone of ornament is then divided into equal parts by aid of the dividers. The perpendicular lines separating these divisions can best be drawn by holding a triangle against the piece and tracing all the perpendiculars from it, care being taken that the base is always horizontal with the base of the piece. This

insures accuracy of all perpendicular lines and is the easiest manner of drawing them over the curved sides of a piece.

The motive is now drawn on tracing paper to exactly fit one of these divisions and traced onto each space. It is better thus to separate a border into its repeats and trace each independently, because on shapes that are slightly irregular or where the border is placed on slightly curving sides difficulty will arise in trying to transfer the entire border from the traced pattern. This also saves redrawing of the entire border to fit the dimensions of the piece.

The tracing is a comparatively simple process on straight sided pieces, but with bowls and curved pieces it is often difficult to fit even single motives for tracing. In extreme cases where the pattern cannot be fitted so as to enable tracing, the more complicated features of the design can be cut out and traced at their proper points of repeat and the remaining pattern drawn in freehand.

A sharp, hard pencil is best for tracing and will leave a good impression in the clay if the paper is not too thick.

After the measuring and tracing is finished the entire decoration should be gone over and trued up with a pencil or pointed tool.

The design itself can now be incised or cut down from the surface of the piece, or the background around the design can be cut down, leaving the design standing out, but, of course, still a part of the contour. This is sometimes called excising to distinguish it from the simpler method. The latter process is more desirable and should be used in all cases, except with bands or simple motives. The part cut out or in-



Fig. 9. Illustrations of Incising and Contour Enrichment, Normal Department, Art Institute of Chicago.



Fig. 10. Surface Enrichment. 1 and 3 excised design, 2 and 4 incised line design. Pieces photographed in the bisque. Engineering Experiment Station, Iowa State College.

cised is usually the background or secondary part of the decoration.

Sometimes it is only necessary to incise a line around the design for satisfactory results, but in most cases more emphasis and character is given if the background is cut away from the design motive, thus bringing it out into more prominence.

The best tools for incising are those which can easily be made by the student from small strips of hardwood cut to give the desired impression. Several different shapes can be made having square, rounded, wide and narrow cutting edges, etc., to meet various demands. A small looped wire fastened into a handle makes a desirable tool for trimming out background or cutting out lines, as it can be made flat or pointed as occasion demands. I have seen students using a fine wire hairpin for this purpose with good results. A small brush is handy for brushing away bits of clay and keeping the carving clean.

Interesting simple patterns can be made by the use of sticks or punches with points in the form of squares, circles, diamonds, stars, dashes, etc., for use by the younger students not yet of design age. This type of ornament can be carried out on small bowls, small tile, paper weights and such simple

objects. These can be glazed with a mat glaze, or if the body is of good color, the incisions can be painted with underglaze colors and then glazed with a bright, transparent glaze.

In all cases where the pottery is to be glazed with a mat glaze the incisions should be from 1-16 to 3-16 of an inch deep, depending upon the size of the piece. This is necessary, for a mat glaze needs to be applied quite thick for good effects and will flow into and cover up decorations not properly incised. For bright, transparent glazes the incising can be as shallow as the designer desires.

We must always remember that we are working in plastic clay and that it is to be covered eventually with a glass-like substance which does not permit of sharp edges. In finishing, all edges should be carefully smoothed. This can be done with a soft, moist brush if care is taken not to destroy details of the pattern.

The finished piece should be dried slowly and carefully and always handled with care until baked, for the incising process has greatly weakened the wall of the piece by making it thinner where the ornament has been applied.

PERIOD FURNITURE

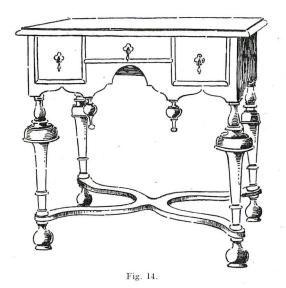
Conrad Weiffenbach and Anton Anderson

Second Article

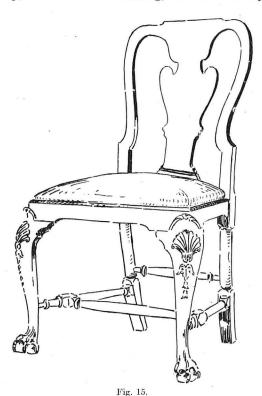
THE WILLIAM AND MARY STYLE.

FTER the final down-fall of the house of Stuart in 1688, the throne of England was occupied by Mary and her Dutch husband, William of Orange. They reigned together for five years and

after the death of Mary, William occupied the throne seven years longer. During these twelve years Dutch influences prevailed in the design of furniture. Furniture of Dutch manufacture was brought over to England by the ship load, and with it came the inspiration for the Dutch styles. English cabinet-makers very widely copied the Dutch pieces of furniture, making such changes as their taste suggested, and from this a new style was gradually developed which has become known as the William and Mary



Style. In the development the stern, severe forms of the Stuart styles of furniture gave way to graceful shapes and sinuous curves. The proportions improved and the construction was made lighter in every way. In large part these improvements were due to the demands of women of refinement who began to assert their influence among the upper classes. In 1690 the bulbous turnings of the Jacobean styles were replaced by turnings in the form of inverted cups, and general simplicity prevailed in ornament. As quickly as the makers of furniture caught the inspiration of the new style it was generally introduced. The dressing table in Fig. 14 is a good example of the style. The general distinguishing features of the style are: Turned legs with the inverted cup-like form near the top, curved under-framing, and arched tops on



cabinets and frames. This style is one of the most popular of the present day.

THE QUEEN ANNE STYLE.

Queen Anne succeeded William and Mary in 1702, and reigned until 1714. William had determined to make all things Dutch, and his influence caused English furniture to take on many characteristics of the Dutch, but not for long, for English national pride soon rebelled, and with Queen Anne came the curvalinear forms in furniture. The body-fitting back in chairs, and the cabriole leg, sometimes called the bent-knee leg, are the most conspicuous characteristics of this style.

Before 1700 all English furniture except the chair shown in Fig. 13, was straight legged, and either square or turned. The cabriole leg has many slight variations in form, but all forms resemble one another

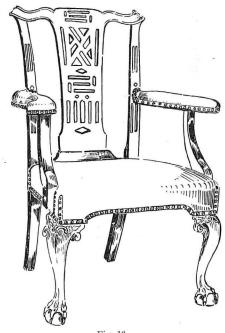


Fig. 16.

very closely in the essential particulars. The differences are simply in the degree of refinement on the one hand, or in the boldness of the shaping in the other. The termination of the leg is sometimes spoon-shaped with a decided angle, but a more common termination is the dragon's claw and ball. (See Fig. 15.) The origin of the cabriole leg can probably be traced to the animal leg-and-claw of the Greeks and Romans.

During the Queen Anne period, the chair was changed from a hard, unyielding piece of furniture to one of comfort in which the body-fitting back and the upholstered seat were the chief features. The seats are generally broad in front, and narrow at the back. Frequently the front rail bows out, and the sides of the chair seat are curved. The splat in the back is in most cases broad and solid, and is shaped to fit the back. Stretchers are seldom used

in chairs and other pieces of furniture in the Queen Anne style.

Wall mirrors were very common in the time of Queen Anne, and in the early Georgian days. The frames were usually flat, and cut in various shapes, to which were applied mouldings of the old "egg-and-tongue" type. They were frequently ornamented with festoons or garlands of leaves and flowers.

Another characteristic of this style is the marquetry work which was of Dutch origin, and which became popular in England during the time of William and Mary. The details usually consisted of leaves, blossoms, and birds, and were made of veneers of sycamore, pear, maple, mahogany, holly, and other woods. The "shell" is another characteristic form of decoration found in many pieces of furniture of this style.

The Queen Anne style was originated during the reign of William and Mary, and rose to great popularity during the reigns of Queen Anne, George I, and for some time during the life of George II. England was peaceful during these years, and artists had an opportunity to create artistic and comfortable things in the way of furniture and other home-making necessities. Up to this time straight lines had largely predominated in the construction of English furniture, and curves, scrolls and foliations were seldom employed, except by the carver and the marquetry cutter. In tracing the Queen Anne style thru its successive stages of development, we find that a spirit of grace and refinement was infused into domestic life, and that it found expression in refined, graceful furniture of a kind heretofore unknown.

THE GEORGIAN PERIOD.

The Chippendale Style.

The Georgian period of English furniture extends over the reigns of the four Georges, and includes the styles of Chippendale, Hepplewhite, Adam, and Sheraton. We have come now to the part of the history of English furniture during which the name of the reigning monarch was not used, but the styles took on the names of the designers and cabinet-makers who originated them.

Thomas Chippendale was a carver by trade.

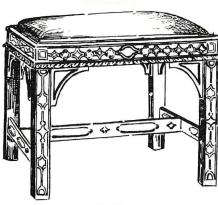


Fig. 17.

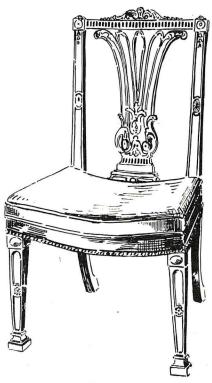


Fig. 18.

He lived and worked at Worcester, and later went to London, where he started a business in St. Martins Lane. His book, the "Gentleman's and Cabinet Maker's Director," was published in 1754. It was the first work of its kind of any importance. Chippendale is regarded, generally, as the chief among the pioneers in the movement which eventually resulted in the evolution of our late eighteenth century furniture. He was among the first in England to use Spanish mahogany of fine figure in the construction of furniture. He was chief among the first to break away from traditions which had been held in reverence for many years. Furthermore, he originated new styles; his work was many sided.

Chippendale found the art of woodworking fully developed and many phases of ornamental styles well completed. Everything was quite ready for him, and he carried the design of English furniture to its highest point of development. He based his designs on Chinese, Gothic, Louis XIV, and Louis XV sources. For his "Chinese Chippendale" he drew his inspiration from Sir William Chambers' work on "Chinese Effects." Chambers Anglo-Chinese furniture was considered a failure, owing to its flimsiness, and also to the designer's lack of understanding of the technical and practical sides of cabinet and chair construction. Chippendale finally developed his own Anglo-Chinese style, and all the pieces he made were rendered in mahogany (Fig. 17). The chief characteristics are lattice work and fret work applied to the solid. The chairs were more or less a success, but the cabinet work was generally considered a failure.

Chippendale became thoroly imbued with the spirit of the Louis XIV and Louis XV styles, and set about to create furniture by grafting the French ideas on his own. He followed the lines of the French chair makers in the matter of detail rather than that of form. The chair shown in Fig. 16 is a rare example of the Chippendale style. The Cabriole leg with the carved detail was borrowed from the "Louis" styles. The top back rail is of his own creation. The fret work on the splat in the back is pure Chinese. Other important details employed in the Chippendale-French designs are the capital "C's" placed back to back and in all manner of positions, generally terminating in scrolls or foliage, shells, scalloping, and almost every variety of rococo detail. In the more elaborate pieces, the ornament is thrown together practically regardless of the result, which was neither pleasing nor decorative.

It was not only from the French that Chippendale borrowed, but also from Italian artists and craftsmen. The Gothic failed to gain his favor to any great extent. However, his Chippendale-Gothic creations embody a quaint charm, tho in some pieces it is mixed with the French and other detail of a hybrid nature. The chief characteristic of this style is the fret work which is almost always geometrical. The Gothic was not considered successful, and he did not pursue it to any great extent.

Of all his furniture, Chippendale's chairs are the best known, and probably considered among his best designs. The most noted four examples are the "Lattice" (Chinese), "Ribband," "Ladder," and "Wheatsheaf" backs. He designed an endless

variety of legs and backs. The legs he used were Cabriole with the claw and ball foot, plain or moulded square, tapered, pierced, or square with fret laid on. Other details peculiar to Chippendale are the "Pagoda" steps on the tops of china cabinets, pie crust edges on tables, classic cornices, raised mouldings on flush panels, French curves and shells of Louis XV (known as "rococo" details) on frames. Most of his furniture was made in solid mahogany. He never used inlay, and very little turning. Fig. 18 shows a transitional chair of "Adam" influence. Here the top rail is shown straight for the first time in the eighteenth century. This chair was probably drawn by the brothers "Adam" and built by Chippendale.

The Hepplewhite Style.

The next firm of note to follow in the wake of Chippendale was that of A. Hepplewhite & Co., who published three editions of a book of designs called "The Cabinetmaker and Upholsterer's Guide." The first edition was published in 1789, and the third in 1794. A. Hepplewhite, who published the book, was a widow and continued the business of her husband, G. Hepplewhite. It is in "Hepplewhite" that we find the first attainment of true, delicate refinement in furniture produced in England during the Georgian period. He succeeded in blending elegance and utility. The basic principles were drawn from classic details, and from the Louis XIV, Louis XV and principally from the Louis XVI creations. However, he refrained from following too closely upon the exact lines of any of them. Thomas Chippendale excelled in chair making, and seldom made complete sets of furniture, while Hepplewhite and Sheraton excelled in side-boards.



For easy identification of style, the chairs of the Eighteenth Century have more distinctive characteristics than other articles of furniture of the period. Chairs will be found more useful and certain as guides in distinguishing one style from another. The designs of Hepplewhite resemble those of Chippendale and differ from those of Sheraton insofar as Heppelwhite avoided the straight line in chair backs almost entirely. Altho he designed other chair backs, the true, characteristic Hepplewhite chair always had the shield shaped, open back. The curve of the top back rail is always unbroken. It forms one graceful, sinuous sweep from one side to the other. Sheraton adopted a form similar to the "shield back" but he always employed a "break" in the top curve by means of a straight line or a rectangular panel in the center.

It is difficult to distinguish between many of the productions of these two designers, for the reason that both went to the same source for inspiration, and frequently appropriated one another's ideas. Therefore, in considering Hepplewhite's style, it is well to keep in mind the minor distinctive features. The joint at the lower part of the sides of the Hepplewhite chair where it joins the back legs was nearly always finished off with a tiny scroll-head. feature is never to be found in the true "Sheraton." In contrasting the arms of chairs made by these two designers, one will find that in the "Sheraton," the arms proper are nearly always shaped in a graceful curve, or series of curves, springing from the back, but they are supported in front, where they terminate, by upright, turned posts. These posts are continua-

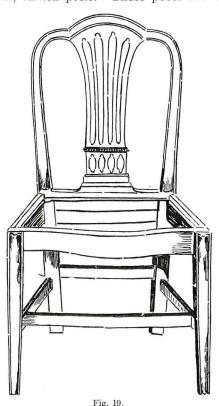


Fig. 21.

tions of the front legs, the design of which is carried up into them. On the other hand the "Hepplewhite" arm usually comes down from the back in a single curve, more or less pronounced, but, instead of being supported in front by the turned post, another curve, nearly always concave, but sometimes serpentine, carries it down to the seat frame. "Hepplewhite" chair legs are, in most cases, square and tapered. Some of these curve out at the bottom. In the less expensive chairs the legs are perfectly plain, while in the more costly they are more elaborate. The chair shown in Fig. 19 is one of the earliest examples of this style, showing the slip seat construction which was discontinued by Hepplewhite after 1770. The curved front top-rail is a distinctive transitional feature. In the "shield-back" chair, shown in Fig. 20, Hepplewhite had reached the limit of excellence. The ribs following the outline of the shield, the fine carving, and the absence of stretchers are distinctively "Hepplewhite."

The chairs, with few exceptions, were made in mahogany, either carved, painted, or inlaid. The seats were covered with horsehair; plain, striped, checkered, or in other patterns, or with cane bottoms, on which loose cushions were placed. In designing his furniture, Hepplewhite thinned down, or reduced every part that could be reduced without sacrificing beauty or durability. The fact that his chairs could be used for so long a time, without stretchers, is evidence of good construction.

Hepplewhite specialized in "tall-boy" chests, knife boxes, vases, toilet glasses, and bedroom furniture. He used veneer and woods other than mahogany. His work is recognized by such special designs as "swags" on chairs and doors, wheatears carved on chair backs, vases introduced as ornament, carved mouldings, the water-leaf,—a favorite detail in carving,— the "husk," "reeded legs," and other characteristics. In the application of enrichment, the services of the most able carvers, marquetry cutters, the aid of painters of the type of Angelica Kauffmann, Cipriani, and Pergolesi were called to execute work, especially on furniture designed for the homes of the wealthy.

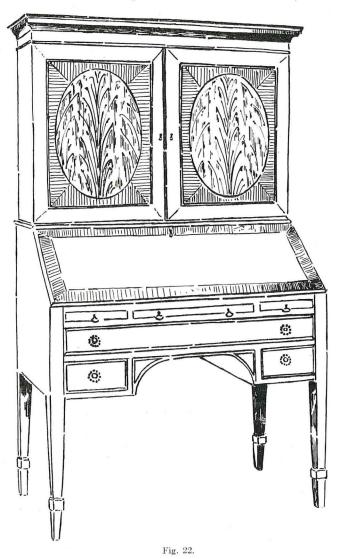
The Sheraton Style.

We know less of the personal history of Thomas Sheraton than we do of Chippendale. He was born in 1750 at Stockton-on Tees, went at an early age to London, and at the time he was twenty was earning a scanty living by writing, painting, and teaching drawing. He was also known as a preacher. His steady cultivation of drawing, combined with a thoro, practical training at the bench, provided a solid foundation for his future work. Coming under the influence of the brothers Adam, he appears to have forsaken his numerous pursuits and to have concentrated his talents entirely upon furniture designing.

Sheraton drew such of his ideas as were not purely original from the "Louis Seize," the most refined of all French styles. The "Louis Quinze," so well thought of by Chippendale, exercised no influence over this upright old master. His work was conscientious in the extreme, and it is well for the student to keep in mind the fact that straight lines, free from deviations, predominate everywhere, and that constructional shaping was seldom introduced. This feature will aid in distinguishing between "Hepplewhite" and "Sheraton," especially where chair backs are concerned. Each borrowed from the other. There are chairs in Hepplewhite's book that are distinctly "Sheraton," and vice versa. The chair shown in Fig. 21 is "Sheraton." It marks the beginning of the end in the evolution of chairs. It will be noticed that the arms and the ornament applied to the front rail are "Hepplewhite" features. The "ribband" back with broken top rail, and the high stopped, tapered leg are pure "Sheraton."

In designing tables, sideboards, and other cabinet work of this class, Sheraton used the square, tapered leg; sometimes it was quite plain, and even then most graceful; sometimes fluted, and sometimes enriched with husks, leafage, inlay and other detail. Reeded and fluted legs, festoons or "swags" of drapery and flowers, the vase, cornucopiae, acanthus-like foliations, are among his chief characteristics, and in applying them he invariably stamped them with the mark of his own individuality. In designing side-

boards Sheraton always made the corners convex, while Hepplewhite almost invariably introduced a concave curve. It was Sheraton who introduced the brass rail across the back, and sometimes at the ends of the sideboards. In many cases silk and other curtains were suspended upon them. This feature was seldom, if ever, adopted by Hepplewhite. The right-hand drawer of the early Sheraton sideboard contained a cellarette, often made to draw out separately from the rest. It was partitioned and lined with lead, and large enough to hold nine or ten wine bottles. The left-hand drawer was usually left plain, but sometimes divided in two; the back being lined with baize to hold plates, and having a cover hinged to enclose the whole. The front division was lined with lead and made watertight, with a drain plug at the bottom for letting out the water that had been used for washing the glasses. This left-hand drawer was sometimes made shorter to make room behind for a cupboard to hold pots, and access to this was gained by a secret door at the end. The observation of these small features, discloses the secret of much of Sheraton's greatness.



Sheraton was most famous for his veneered work, including marquetry and inlay in various colored woods. He was the first to use satinwood to any great extent. Fig. 22 shows a typical "Escritoire" or secretary of his style, built about 1795 of satinwood and mahogany. The herring-bone effect in the doors may be seen upon many pieces of furniture of this style.

Another important phase of Sheraton's work is his "Inventive Furniture." His exhaustive knowledge of geometry, his love for mechanics, and his regard for utility led him to work out problems in cabinet construction never before attempted by any other member of his craft. His step-table is one in which a step ladder is folded within the frame. His "Harlequin" table serves not only as a breakfast table, but also as a writing table suitable for a lady; the pigeon-holes and nest of drawers may be dropped out of sight, much on the principle of a modern drophead sewing machine.

It is necessary to mention the eccentricities that characterize the later designs of Sheraton. When seeking for originality he resorted to all sorts of fantastic motives. This was probably due to the effect of a mind worn out by disappointment of losing influence on a public that was losing its taste for simple beauty. Fig. 23 is an example of his best later work. It is an original design, and shows his drift away from the "Adam" influences. It also shows a feeling in favor of the classical forms. Here he has resorted to a decoration in white and gold. The fashion of gilding furniture had been sparingly adopted up to the end of the seventeenth century, but soon after that time it was used to a great extent. The chair shown in Fig. 24 was designed but ten years later and shows a remarkable decline in Sheraton's work, especially in so short a time. It rounds out the cycle in the evolution of chairs, this being one of Sheraton's last creations. The "Empire" lines in this example indicate a return to the classical.

Chippendale, Hepplewhite, and Sheraton were not the only men employed in designing and making furniture during the reign of the four Georges. It is a recognized fact that all the furniture which is now classified as "Chippendale," "Hepplewhite," and "Sheraton" was not wholly the creation of the designers whose names it bears. There were such artists as Shearer, Ince, Mayhew, Lock, Manwarring, Hope, Johnson, Crunden, and other contemporaries

whose work helped in no small degree to make this trio famous.

The Adam Style.

Robert and James Adam were architects who flourished during the reign of George III. They were at work on the production of designs in architecture during the time when Chippendale, Hepplewhite, and Sheraton were creating their best designs in furniture. In 1768, before he was forty, Robert Adam was appointed "Architect to the King," and entered Parliament, where he won popular favor by the character of his rendering of the classic. Together, the brothers designed many of the large houses in London, and the furniture associated with their name was designed for these houses. They were built in the lighter and daintier phases of the classic, and decorated with delicate Roman details. mouldings were of the simplest and purest classic order, chief among which were the dentil, "Roman Key," egg-and-tongue, acanthus, rosettes, oval medallions, vase and urn, garlands and wreathes, reeds and mythical figures. The flutes, both plain and stopped. are the decoration most commonly used at the present time on furniture of this style.

When Robert Adam designed his cane and painted furniture in the eighteenth century (much of it was painted in white and gilt), he probably did not realize that more than a century later his work would take on new life and charm.

With the close of the eighteenth century, the originality and real beauty in English furniture ceased. Technically the work remained excellent, but the taste for the beautiful gradually disappeared. After the death of George III, in 1820, architecture, the parent of furniture, became ugly and uninteresting in England, and jewelry, plates, and textiles were but imitations of former periods.

Foreign ideas and designs greatly influenced English craftsmen. But these ideas and details being strained thru English minds, gradually developed a distinct human interest characteristic of all branches of English art, in which nothing is more nationally representative than furniture.

As has been stated before, it has not been the intention at this time to give a thoro and exhaustive history of the subject. However, in addition to the detail drawings, rods, and stock bills, proposed in the regular monthly articles to follow in this series, more of the particulars will be given.

TIME AS A FACTOR IN SCHOOL SHOP WORK

John H. Brown, Director of the Manual Training Department, Glendive, Mont.



T is hard to realize that most school shops, modern in every other respect, keep time by the "rule of thumb" method. Surely it is important that the boys should realize the value of time, for when they

leave the school and go into the commercial world they immediately have to confront the time problem.

In the olden days when a man broke an ax handle he stopped and made a new one, losing one man's time plus one ax's time. Nowadays if a man breaks a belt the whole shop is out of tune until he has it fixed; and it costs many times the one man's wage. Many men in the industries at the present time work where the over-head is more than his wage. It is the employer's right to expect and get efficient work from his men; and it is the right of the boys, especially of those who are given vocational training, to be trained to do efficient work and have the proper value of time as a factor of success taught to him.

Granted that a knowledge of time value is important, the question arises: How can we apply a time system to the school shop? The following method, based on the system invented by Dr. Taylor, has been tried and found successful. "It gives unusually high pay to the man who turns out a high output and low pay to the inefficient workman." It demands high quality and offers a premium for fast work. It encourages the individual to put forth his best efforts in honest competition, knowing that the reward will be fairly based on his work.

The following plan can be adapted to most school shops. There are three kinds of time to be considered:

First, regular time or that time that is required, usually from seventy to ninety minutes a day, two to five days a week, for twenty weeks, or from four to fifteen days of ten hours each a semester.

	L TRAINING DEPARTMENT ON COUNTY HIGH SCHOOL NOT VALID UNLESS	PUNCHED
DATE BEGUN	WORKMAN'S NO.	
DATE COMPLETED	JOB NO.	
	JOB CARD	
DATE	WORK DONE	TIME
TIME ALLOWED	TIME USED	

Fig. 1. The original card measures $4\frac{1}{2}$ "x6" and affords space for 13 entries.

Second, make-up time or that time which is lost because of absence or fines. This offers a chance to penalize a boy for inefficiency of any sort, i. e., loafing, disorder, or tardiness (a plan that is followed in the modern commercial shops), by fining him a certain amount of time. This will in a large measure solve the problem of discipline.

Third, overtime or any time in excess of regular, plus make up. This makes it possible to set a standard for the reward of effort and interest. This in a school of compulsory attendance is a serious problem, or for that matter in any school.

Each job as it enters the shop is given a job number. Every time a workman starts a new job he starts a job card for that job, Fig. 1, making an entry every time he works on that job, turning in the totaled card when he has completed his work on that job. By glancing at this card the instructor can tell just what work has been done and how long it took to do it.

A daily time card, Fig. 2, is filled out every time a workman does regular work, and serves, first, as a check on the job cards; second, as a stimulus to the workman (he knows that the instructor will see just exactly what he has done); third, to check the equipment; fourth, to enable the instructor to keep in touch and have a record of the progress made by each student. It gives a personal touch between the student and instructor every day.

A make-up card the same as the daily card but of distinctive color is used for all fines. Sometimes in an extreme case the back of the card may be used to note the offense and this when placed on file eliminates the chance of any argument..

An overtime card similar to the daily card is used for all overtime work and it is also entered on a special overtime job card which is totaled and handed in, each grading period. Credit is given for all overtime, which may be considered as effort and interest. A satisfactory rate is as follows: add to the final month's grade one per cent for every one hundred minutes perfect work, for the first five per cent, for each successive five per cent double the time. The percentage of full credit that each workman is entitled to is determined by his monthly grade, for instance a workman receiving eighty for a mark would have to work five hundred minutes overtime to raise his standing to 84. This gives the boy who is willing to try a chance to receive the consideration due him for trying. In this shop in the past six weeks ninety boys, total enrollment, have put in 979 hours, of sixty minutes each, or an average of over ten hours each, which is 104 per cent of the regular time. workman catches up; the fast makes something extra.

MANUAL TRAINING DEPARTMENT GLENDIVE CITY SCHOOLS NOT VALID UNLESS PUNCHED Condition of Bench and Tools DAILY TIME CARD WORK DONE JOB NO. TIME

Fig. 2.

Sometimes a shop job is let by contract, each bid to be in terms of points to be added to the final standing and to be done outside of regular hours. Much excitement is had over these jobs, as the boys figure the time and material needed for the job; for the lowest bidder gets the job.

This brings us to the problem of transforming a rate of time into grade or comparative rank. The efficiency of each workman is determined by the amount of marketable work that he can turn out in a given time. We may divide labor into two components, quality and speed, and each of these into four sub-divisions.

They may be given a rating as follows:

Quality: Spoiled, below 50%; poor, 50%; good, 58%; expert, 66%.

Speed: Wasted, below 25%; slow, 25%; medium, 29%; fast, 33%.

This rating gives quality twice the value of time. Any two that have a combined rating of more than 75 per cent is acceptable. If a workman spoils work he wastes more than his own time and his rating on quality is so low that no matter how fast he works he is not wanted. In fact the faster he works the more he spoils. Some trades as pattern-making will demand expert, plus slow, medium, or fast. But bear in mind that the combination fast and expert can always have the job at the highest wage. The value of any man can be determined by this method. In the school shop a time limit must be set on each piece. If a workman saves time his speed rating will be raised for every minute saved. This will allow every boy to follow his individual method and gives him a fair chance. If he takes a long time he must do an extra good job. But the time element is always there urging him to "keep on the job." If a boy wastes time he is forcibly reminded of it when the time taken is posted.

When fixing the allowed time remember that we have three kinds of time, (1) estimated, (2) absolute, (3) efficient. The boy who is learning must be allowed from three to seven times efficient time. The following figures are taken from two classes of eighthgrade students beginning woodwork. All time is in minutes. All standards of quality were placed very high. No variation of over 1-32 part of an inch was allowed on size, and no allowance other than that permitted on a good grade of cabinet work was allowed on the joints. In all cases all surfaces were squared.

R. 1 to R. 5 first five weeks of beginning woodwork, 8th A grade. Board any exact thickness x $5\frac{3}{8}$ x11 13-16' Minimum time Average time 1110 Maximum time Allowed time Slightly more variation was allowed on this piece, in some cases sizes were changed to smaller ones twice, giving three chances on the same piece

of stock. Cross lap joint any medium size. Average time Minimum time Maximum time 1425 Allowed time 540 End lap joint any medium size. (All saw work, no chiseling allowed.) Minimum time Average time 818 Maximum time 1720 Allowed time 720 Slot mortise and tenon. (No chiseling except on the waste of mortise.) Minimum time Average time 175 745Maximum time 2195 Allowed time 720 R. 7 to R. 11 first five weeks of 9th B grade, same classes as above. Thru mortise and tenon.

(No chiseling of tenon allowed.) Minimum time Average time 617 Maximum time 1030 Allowed time 540 R. 8. Nailed mitre joint. (Cut with back saw, planed to fit.)

Minimum time 65 Average time 79 750 Maximum time Allowed time 90 Common dovetail about 3" wide, three pins. Minimum time 275 Average time 441

540 Maximum time Allowed time R. 10. Picture frame, 4 mitred, glued, and nailed joints made from moulding. The finish dividually in any standard finish.

1340

Minimum time 295 Average time 1255 Allowed time 810 Maximum time

In all cases the stock was soft wood furnished in rough boards, each individual getting out his own stock, except in R. 10. R. 3, 4, 7, and 9 were glued and surfaced on all sides, testing three ways, and given one coat of shellac. These classes were compulsory and were the average run of students, no selection in any way having been made. In many cases the surfacing of the joint after gluing took more time than the actual making. Frequently a joint was spoiled, planed under size when surfacing, making it necessary to make an entire new piece. At the end of the year a test was made and less than five per cent failed to complete R. 7 in 90 minutes, glued, surfaced, and shellaced.

In this shop both the boys and the instructors are very enthusiastic over the system. The boys spend a great deal of time planning their work outside of class in order to save time. The instructors and the boys realize that the time taken is an absolute value and the relative grading is a matter of mathematics and not personal opinion.

It helps a boy to know what to do and keeps him doing it.

A REAL PROBLEM IN PRODUCTION

Hans W. Schmidt, Oshkosh, Wis.



HE criticism is often made that schools training teachers do not give their students real life conditions to work with; that the environment and the product are more or less artificial and do not touch

life's work to an extent sufficient to give real worth to the work in hand. This condition will always exist to a greater or lesser degree in the very nature

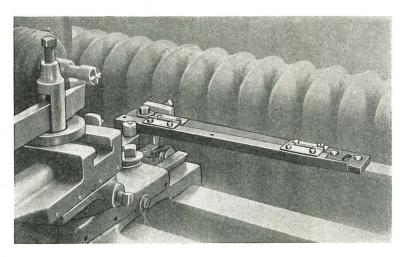


Fig. 1. First Roughing Former, Special Spur Center and Roughing Gouge.

of the problem, but it may be minimized with proper forethought and where facilities are adequate.

Having this criticism in mind, the department of industrial education of this institution has sought to overcome this handicap of artificiality in the training of teachers, by bringing them early into contact with realities, with production and thus lay a foundation for later efficiency, not only a technical efficiency but a pedagogical one as well. It has, therefore, been a policy to do productive work all along the line. For example the cabinet shops have been turning out commercial work in quantity; the machine shop is doing machine shop work and testing for

commercial concerns.

But to take our specific problem. A certain large state-wide association is to have a convention in this city during the summer and it was planned to give to the ladies attending a souvenir of some kind, a souvenir which would, in a measure, reflect the important industry of the city, the woodworking industry. The department was approached to see if it could not furnish something in the way of carrying out the suggested idea and it was finally decided to make some eight hundred solid mahogany candle-sticks, to be stained, filled and two-coat rubbed varnish

finish, with brass inserts and felt covered bases. A contract was entered into and it was up to the department to "make good."

It was manifestly out of the question to make the candle-sticks by hand turning without making the cost prohibitive. It was, therefore, decided to design and build a machine to do most of the turning; the bases could be made by hand very easily. Due

> to the skill and efforts of Mr. W. Ray Challener, instructor of machine shop practice, a machine was designed by him and built in the shops which has served its purpose admirably. Two, or rather three, devices were used to make the standards. One of the pattern lathes was fitted up with an attachment to rough out the stock in two operations to get it ready for the final machine cut. It was found possible to do the whole work in two operations but smoother work resulted by using two roughing operations rather than one. The roughing device is well shown in Figs. 1, 2 and 3. An adjustable forming guide was made against which the hand feed carriage is forced by means of a roller and weight. Figure 1 shows the taper roughing former;

this was hinged and permitted the second roughing operation to take place by swinging the former out of the way, exposing the second former, as shown in Fig. 2. Figure 3 shows a piece blanked after the first operation. The pieces of stock were prepared by cutting them into blanks $1\frac{7}{8}''x1\frac{7}{8}''x12''$. A $\frac{3}{4}''$ hole, $\frac{3}{4}''$ deep was bored into one end while the other end was centered for the tail center. Special spur centers were made to insure accurate centering in subsequent operations and are plainly shown in the figures. It was necessary also to make a special roughing gouge and extension tail centers.

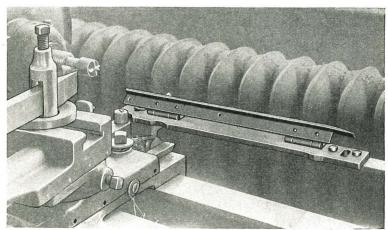


Fig. 2. Second Roughing Former, First Former Swung Out of the Way.

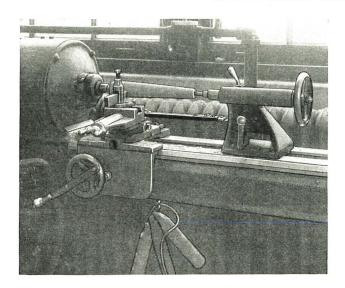


Fig. 3. Finishing a Roughing Cut. Note Weight to Pull Carriage Against Former Guide.

The finish forming knife was made on the principle of the "back knife lathe" and is clearly shown in Fig. 4. The knife was mounted upon a temporary wooden carriage for this job, but it is intended to make a permanent mounting for it so as to make it available for other work of this nature. It is brought forward and under the blank by means of the operating handle. The work comes out remarkably smooth and needs hardly any sanding.

Figure 5 shows some of the candle-sticks completed, except sockets and felt base covering. Those in the background have been stained. The work has been done by the first-year cabinet-making class under the direction of Mr. Forrest R. Polk, instructor in elementary cabinet-making, and without whose untiring efforts the work could hardly have been undertaken.

The sockets are commercial articles while the

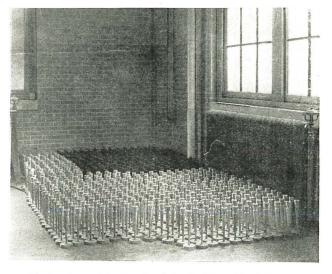


Fig. 5. Some of the Completed Candlesticks. The dark ones have been stained.

felt covering the bases will be cut by means of a striking die, also made in the machine shop. That a problem of this kind, a problem which is developed wholly within the school and is made possible thru the co-operation of all of the various departments, is valuable from all of its various angles, goes without saying.

The time element in producing the mechanical work of the standards was well worked out and a little motion study resulted in the following: Time for first roughing cut, 30 sec.; second roughing cut, 40 sec.; finish forming, 35 sec. This included, in every case, chucking and removing. Not a bad record for amateurs. No individual time record was kept for the finishing operations. Credit should be given to the cabinet-making class for the efficient work done in bringing this work to a successful ending.

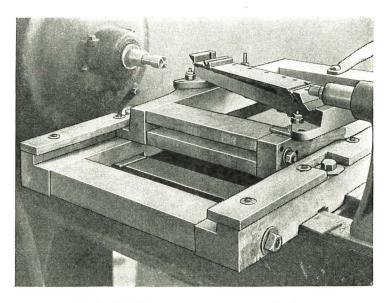


Fig. 4. Finish Forming Knife on Temporary Carriage.

INDUSTRIAL-ARTS MAGAZINE

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EDITORIAL

VOCATIONAL EDUCATION AND THE WAR.

WITHIN recent months, we have witnessed the phenomenon of the American nation's appropriating a war fund of \$7,000,000,000, the largest amount ever appropriated in one sum by any nation or corporation. Few of us can comprehend even a million, yet we are speaking in terms of billions. We read with perfect complacency how our Congress has appropriated hundreds of millions of dollars for various purposes. No one would think of questioning the propriety of these appropriations or expenditures. They are necessary and cannot be postponed. Yet the wise man, when he places a mortgage on his home, at once begins to plan how the note can be paid.

The interest on \$7,000,000,000 at 3% is \$245,-000,000 a year, over \$20,000,000 a month. This country has just witnessed the collection of a fund of over \$100,000,000 for the Red Cross in the war. To pay \$7,000,000,000 in thirty years, will require \$233,333,333 a year. In addition, we are going to withdraw from productive employment one and one-half millions of the strongest, most virile young men in the United States. Estimating that each of these young men produces annually an output to the value of \$1,000, this means a reduction in our production of \$1,500,000,000 annually.

To a majority of us these figures mean nothing, as they are beyond our comprehension. We can get some idea of their size, however, from estimating that the bill to be paid each year for some time to come will amount to five hundred million dollars, or roughly, ten million dollars a week, or one and a half million dollars a day. To be sure, this grand total will be divided among our population of over one hundred million people and when so divided does not represent a large amount for each individual.

Many of us can remember how we, as children, felt that when articles purchased from the grocery were charged "on the book" that the transaction was closed, and need worry us no further. We cannot as responsible adults view the present situation in this childlike manner. The bills must be paid sometime, and each and every person in America must bear his share of the burden.

To a large part of the population this will not mean merely the elimination of some luxury which will not be greatly missed, but it will mean a hardship. The only method of avoiding severe hardship is by increasing the productive ability of every wage earner. This is the task of vocational education. It is fortunate that the President, busy as he is in these strenuous times, has found the time to appoint the National Board for Vocational Education, and it is to be hoped that this board will enter at once upon a constructive program for meeting the situation. With the number of producers reduced by the ravages of war and with additional obligations to be met in the way of war debts, pensions, etc., it is apparent that their task is colossal.

It is told on good authority that on a certain day at the time of the opening of the war, in one of the large factories in Germany a bell rang and all the machinery stopped. Every man gathered up his tools, his jigs, and blueprints, walked up to the storekeeper and handed them in. A certain percentage of the men went to the paymaster, drew their pay and went away to the army. The others went to a different storeroom, received new drawings, new jigs and new material, went back to their machines and in two hours from the time the machinery had stopped, it was running again at full speed turning out war munitions. Compare this with the time that it is taking us Americans to change our factories over. At the close of the war, it is altogether probable that the German government will have its plans just as well prepared for competition in commerce and industry and that, figuratively speaking, within two hours after the war machinery stops, the industrial machinery will start up again.

We have seen how inefficient a democracy is in making war and this is perhaps one of the blessings of democracy, but is an entire absence of all efficiency in time of peace, one of the necessary concomitants of democracy?

It will not be many months after our first large contingent of troops goes to the front until we will see returning a large number of crippled and disabled men. To re-educate their armies of disabled men, other countries have found it necessary to open special schools and establish special courses in order to give them the training that will fit them to be selfsupporting. This is vocational education of the highest order, and the country is under obligations to provide it. Preparations to meet this situation should not be postponed until the disabled soldiers return, but should begin at once in order for them to re-enter industry. Even after they have received their training, places must be found for them, and this will require that the persons now in those positions be trained for other positions—positions which could not be filled by disabled men.

The task of every person engaged in vocational education should be apparent. The situation calls

for the most intensive efforts. Industries have already begun to place girls and women in places formerly held by men. Department stores and hotels are using girls as elevator operators. Men waiters are giving place to women, in restaurants and cafes. These positions require very little training and are easily filled, but as men leave for the army the demand for training will be more and more insistent, and it must be provided if our industries are to be maintained during the critical period, to supply our armies with the necessary munitions and supplies.

FALSE ECONOMY.

THERE is danger in the widespread and wise movement for economy that some very unwise and shortsighted things may be done in the school field. False economy in the school wastes money in the long run. If it stopped there, it would not be so serious. But the false economy that means inferior instruction, lack of facilities, and shortening of the school year brings loss and damage that can neither be compensated for nor recovered.

Anything that means the curtailing of our children's opportunities, the narrowing of their outlook, or the rendering of their efforts less effective is an evil that should be zealously resisted. In the special lines of work, the buying of cheap and inferior equipment or the failure to provide needed facilities for high grade work is false economy. The reduction of teachers' salaries to make a slight "saving" is not only false economy but at this particular time is an unwise, unwarranted, and ungracious step.

Let the economies take on the form of wise expenditure, careful selection, the elimination of the useless, the conservation of time and materials, the use of one shop or set of facilities to its fullest capacity, and an increase in the efficiency of the instruction and of the pupils' efforts.

The safety of our country demands that the efficiency of the public schools should be the last to feel the touch of financial stress.

KEEP THE HARE AWAKE.

A RECENT interview with a young American aviator who has returned from a year of strenuous service in France brings out the significant fact that the French and American fliers prefer to go alone in their conquests of the air, while the German aviators invariably operate in squads.

This daring initiative is peculiarily successful in aviation according to the report of this returned aviator.

The story of the tortoise and the hare has been in schoolroom use since its invention and needs some revision.

After all it would take but a little attention on the part of the teacher to make the hare wake up in time to win the race or perhaps if the teacher was fully awake to the hare's ability he would not go to sleep on the job.

We hear much of needed attention to the tortoises in our school discussions and their plodding tendencies have been commended to us thru German example, yet we have a suspicion that such methods are not the best for mixed classes of hares and tortoises. The hare must be kept awake in our American schools.

LET'S HAVE THE GOOD POINTS TOO.

VERY soon now the letters will begin to come in from those who have gone to new positions telling what horrible conditions they found on landing at the new places. Perhaps it is a good thing to point out the evidences of the shortcomings of predecessors, but one should always be certain in referring to such imperfections that he is actuated by the proper motive and spirit. Besides are there never any good things done by predecessors? May we not hear about those also? We all do badly enough at our best, but most people do something undoubtedly that is worth reporting along with their failures.

How easy it is for one to get the habit of "knocking!" And how difficult it is to be fair and considerate. There are supervisors who make themselves excessively disagreeable by constant grumbling. There are those also who become cynical and who take everything, even life itself, at a discount, and who have only words of criticism concerning the efforts of others. Sometimes such dispositions arise out of envy or a consciousness of self inferiority which the owners attempt to cover up with self praise and presumption.

The bad methods, the slovenly teaching, the poor workmanship of teachers must be discreetly and justly laid bare in order that others may profit by such exposure. But let us be sure not to let the discovery of an occasional, or even frequent, offender blind us to the good things or drive us into cynicism.

THE agricultural courses in our high schools have too largely resolved themselves into courses in science taught agriculturally. What we need in these schools are courses in farming taught scientifically. The product of the high school course in farming should bear the same relation to the technically trained agriculturist as the trained nurse bears to the physician. It is the function of the agriculturist to diagnose and prescribe; it is the business of the farmer to administer his farm and to nurse plant and animal life.—Edwin R. Snyder, California.

A MAN'S heart must be in his skill and a man's soul in his craftsmanship.—Mabie.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing,

design, etc., should be sent.

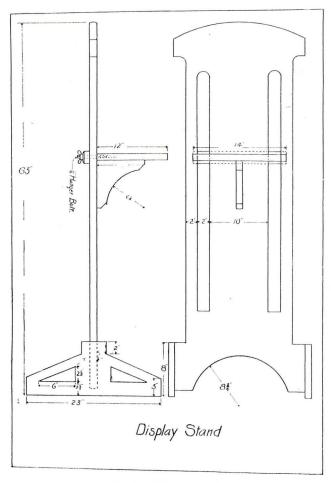
Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

MERCHANT'S DISPLAY RACK.

H. C. Mohler, Pana, Ill.

Merchants are on the watch for window display material. Among the articles made for this purpose is a display rack as shown by the drawing. The shelf is adjustable, and the top is made so as to hold a coat. The hanger bolts may be made by sawing the head off of a 4" screw of suitable length and threading to receive the wing nut. The stand is in use in a clothing store.



Details of Display Stand.

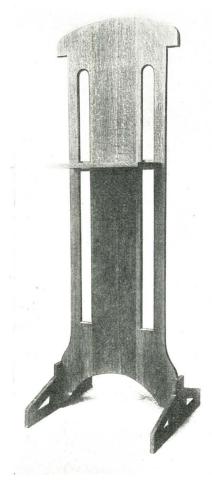
RUFFLE GATHERING.

S. Edith Cole, Instructor in Domestic Art, Lawrence, Kans.

When gathering the ruffles, before sewing to the insertion, begin at the center one-fourth inch from the upper edge and gather to the mitres. Use No. 50 thread and a No. 9 needle. Always use a knot when gathering.

By gathering, we mean running or shaking the needle thru the cloth, using small stitches of equal length on both sides of the material.

The girls should be taught that the best and easiest way to gather, is to place the thimble at the eye of the needle, the fore-finger on the under side of the material, the thumb on top near the point of the needle, then with an up and down motion force the needle thru the material. This makes it

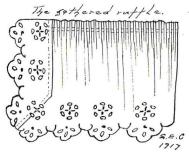


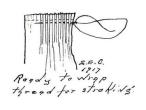
The Display Stand.

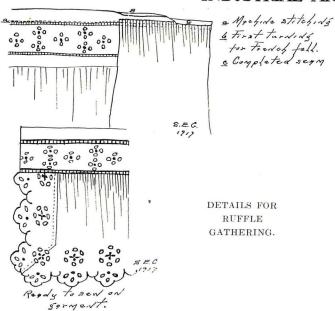
possible to keep the stitches more uniform in size and is much more rapid.

It is not necessary to pull the needle entirely thru each time, simply slip the material off at the back of the needle as you work.

A second gathering thread should be put in one-third inch below the first gathering, stroking the gathers on the needle. To do this after the needle is well filled with the material, the thread from the eye of the needle is wrapped back and forth, from point to eye of needle, to hold the gathers; then holding firmly between the thumb and forefinger with the other hand pull the gathers in place. Take







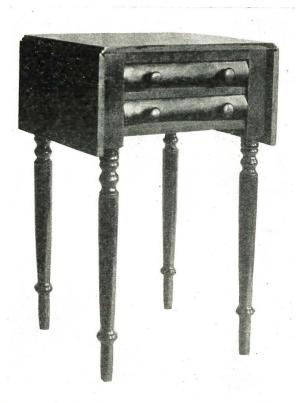
hold rather closely to the needle when pulling the gathers. Unwrap the thread and repeat with the next needleful.

The two gathering threads and stroked gathers facilitate the sewing on of any ruffle. See illustrations for different steps in working.

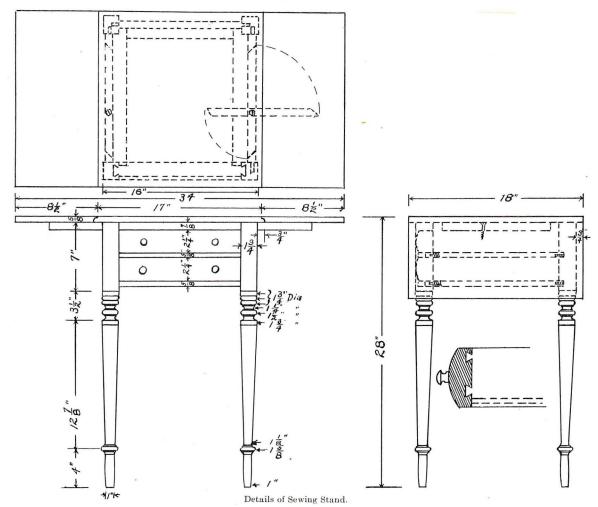
PERIOD FURNITURE.

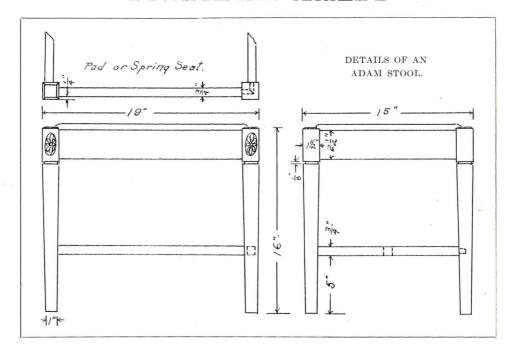
George K. Wells, Kansas State Normal School, Emporia, Kans.

Period furniture is not being introduced into the manual training shop as a panacea for all ills but as a necessary change



Sewing Stand made by Student in the Emporia State Normal School. (Student's adaptation of an old American design).





in design in order to keep up with the advance in modern furniture styles and ideas of good design. Today any manufacturer who shows new styles and designs in Mission or Arts and Crafts furniture will be considered entirely "behind the times." The manual training shop should at least keep abreast of the times.

In reality, period styles offer more variety in design and construction than does the mission or art and crafts. Beginning with the Egyptian with its characteristic supporting curve and coming down thru the Greek with its reverse curve and the unending spiral, the Gothic with the tri-foil and quarter-foil and pointed arch, the Italian and French Renaissance with its excellent lines, the different styles of the three Louis in France and the Tudor, Jacobean, Queen Anne and Georgian periods in England we have a series of styles, each rather complete in itself and each showing some special features of good design and fine workmanship. Out of this mass of excellent material one can pick and choose and thereby secure a variety of styles and prices that cannot help but interest and attract the efforts of anyone.

To make the intricate designs of any one style as they were originally made would not be expected or desired in any school. But we are learning successfully to adapt to our present-day life and to the ability of our average school boy such lines and styles as can be made in the school shop.

Three things must be considered when planning any furniture. These three things are style, construction, and utility. It matters not which one we place first; we must consider them all before we have a useful and artistic product. A heterogeneous collection of all styles will not please the eye or come under rules of good design. We may choose our style and construct the piece well; but if we do not consider the use to which it is to be put, we do not have a good design.

The Adam seat or stool, illustrated, is graceful and light and was made to go with an Adam writing table. The only difficulty in construction might come in making a good joint at the cross rail and leg. This can be made accurately, however, by drawing three lines on a sheet of paper at the angles of the legs and rails with tape, and adjusting a bevel square to this angle. The ornaments may be purchased for a few pennies from the Syracuse Ornamental Co.

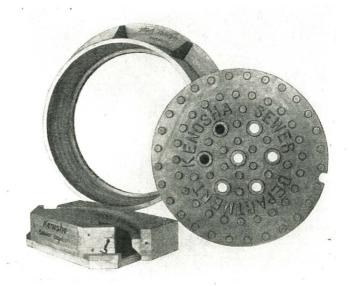
A PROJECT IN PATTERN MAKING.

H. W. Kirn, Supervisor of Manual Arts, Kenosha, Wis.

The accompanying illustrations show a practical problem in pattern-making, undertaken by students in the second



The Adam Stool designed and made by Student in the Emporia State Normal School.



The completed patterns for Manhole Cover.

year of the Kenosha high school. The drawings were made by a first-year student, and the "job" was assigned to two reliable boys to each of whom two assistants were given. The job aroused such interest that before it was completed almost every boy in the class had done something on it.

The patterns and core box are in successful use in casting sewer covers and frames for the Kenosha city sewer department.

VOCATIONAL EDU-CATION IN WYOMING.

Conspicuous among the new plans for education set on foot by the Wyoming board of education is the matter of preparing the scheme for vocational education in accordance with the Smith-Hughes bill,

which provides for a co-operative scheme between the nation and the states for encouraging vocational education. The last Wyoming legislature enacted a bill accepting the Smith-Hughes federal aid and providing that the administration of vocational education be under the State Board of Education. The board has, as its present duty, to devise plans for vocational education to be submitted to the Federal Board at Washington.

Before such plans can be made it has been thought advisable to make a vocational survey of the state to determine conditions in agriculture, in the trades and in the industries. Analysis of such conditions should show what kinds of vocational education are needed, hence the state board has planned to employ in the near future a vocational

MANHOLE HEAD
REMOSHA SEWER BEPT
LEmands Six Line
KHS | SCALES FOR 18-5

expert, who will spend a month in conducting a survey of vocational conditions in the state.

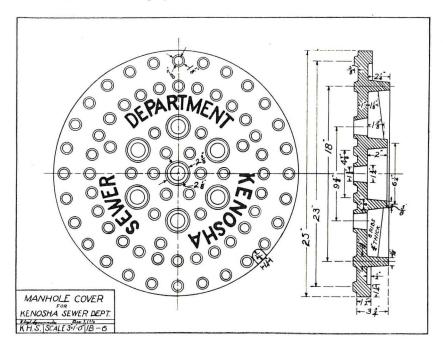
The facts revealed by such a survey will be used as a basis for recommending a state plan of education. There are in Wyoming approximately twelve thousand pupils between the ages of 14 and 18, who should be going to high school or attending some school in preparation for a life career. The facts show that there are only three hundred of these actually attending high school, leaving about nine thousand who are either at work in non-profitable positions or are idle and not attending any school. It is believed that vocational schools or vocational courses in connection with schools already established will do much to overcome this condition.

FARM PROBLEMS IN MANUAL TRAINING.

The high school manual training department of Anderson, Ind., during the past year has demonstrated the value of practical work in manual training and its special application to the farm. The fact that many farmers in Madison County were in constant need of hog and poultry houses, chicken coops, etc., convinced Mr. N. F. Fultz, the director, that here was a field for the farm boy in manual training. Mr. Fultz realized that such special work could not fail to make its appeal to these students and plans were made for the inauguration of the work.

In constructing each project, the boys made plans to scale and drew up a bill of materials to accompany it. Small barns, farm gates, etc., were built. Two boys, working together, were able to make hog houses at a reduced cost, thru the use of native lumber for framework, floor and runners.

After a year's trial, the plan is declared by Mr. Fultz to be an entire success. Blueprints and bills of material prepared by the boys are loaned frequently to farmers who are in need of special structures. It is planned to extend the work thru the entire four years, combining foundry work with the repairing of farm machinery. Practical blacksmithing is undertaken as a part of the regular course.



SHOP BULLETINS IN CITY SCHOOLS

An Illustration of Helpful Material which Supervisors can Distribute for General Use

The Shop Bulletin or circular of information is one of the simplest and most economical methods of passing information on to teachers and students in manual training depart-While the Shop Bulletin can never replace that helpful type of supervision which consists of personal visits, honest criticism and helpful suggestions on the part of the supervisor, the bulletin may easily contain much matter that is of general interest and that should be kept on file where teachers and supervisors may refer to it.

Below we reproduce two examples of Shop Bulletins which are particularly helpful and which may be suggestive for both their content and for the method of presentation.

The bulletins were prepared by Mr. C. M. Haines, director of manual arts in the Fort Worth, Texas, schools.

Shop Bulletin No. 3, 1917.

Please be economical in use of screws, nails, stains, paint, varnish, shellac, oil, wax and turpentine. Owing to the steadily increasing cost of the above articles it is especially urged that each pupil make himself a self-appointed committee of one to stop all waste of material. Do not use more screws, nails, etc., than are absolutely necessary and put all extra hardware back in the drawer from which it was taken. Pick up all nails, screws, etc., and give them to the instructor. Pour back in the container all surplus stain, oil, shellac, turpentine, paint, etc., but do not pour back shellac and varnish. The prices now charged for lumber per foot include all finish, screws, nails, etc., and these will have to be increased soon if rigid economy is not practiced by all pupils. Please use sandpaper until it is all used up and then return the used pieces to the instructor. The price of lumber has not advanced but please be economical in the use of this material; use pieces from the scrap box whenever possible in preference to using from the lumber rack.

Rules for Operating Single Surface Planer.

- 1. Never wear loose clothing near a planer.
- 2. Keep hands away from feed rolls.
- 3. Never stand behind planer while operating.
- 4. Never pass lumber over the top of the planer, pass underneath or to one side.
- 5. Never take too heavy a cut. When machine chokes down pull the switch and start board over again with a
 - 6. Always see that planer is properly oiled.

Don'ts for Blacksmiths.

- 1. Don't fail to remove all burrs from the heads of tools.
- 2. Don't try to cut off pieces when iron is cold.
- 3. Don't put your head over a job when cutting off a piece, as it may fly up and injure you.
 - 4. Don't hang hot tongs on the tool rack.
 - 5. Don't work with hot tongs.
 - Don't work with loose handles on your tools.
 - Don't use your cold chisel as a hammer.
- 8. Don't fail to exercise care when picking up iron it may be hot.
- 9. Don't fail to scrap burned material and material with defective welds. If used, someone may get hurt.
- 10. Don't try to work and talk with someone at the
 - 11. Don't forget to repair your broken tongs. 12. Don't fail to use tongs to fit the job in hand.
- 13. Don't get potash on your hands when case hardening, as it is poisonous and dangerous.
- 14. Don't wear gloves of any kind when working on

Shop Rules.

- 1. Think. 2. Pay strict attention to your own work and stay at
- your own bench. 3. Keep your bench in good order and your tools in their proper places.
 - 4. Do not allow your tools to get on the floor.
 - 5. Always keep your tools sharp and in good condition.

- 6. All tools broken or lost thru carelessness must be paid for or repaired at once.
- 7. Do not throw away sandpaper until it is worn out.
- 8. Use sandpaper block but do not nail or glue sandpaper to block.
- 9. Do not waste lumber or hardware unless you expect, to pay for it.
- 10. Before cutting stock from the lumber room look in the scrap box for material needed.
 - 11. Wear a suit of overalls and save your clothes.
- 12. Have a coupon book so your work will be paid for when finished.
 - 13. Do not leave the shop without permission.
- 14. Do not attempt to finish a piece of work until it has been inspected by the instructor.
- 15. If you expect to stay in the shop do not interfere with your neighbor.
 - 16. Do not loaf.

Nails.

The most common fastening used in wood is the wire nail. There are many kinds of nails; common wire, finishing, casing, box, roofing, barbed nails, and brads. Nails are bought and sold according to length, spoken of in terms of penny (that is d).

, (Table of	Equivalents.	
$2d-1^{\prime\prime}$	6d-2''	10d-3''	$30d-4\frac{1}{2}''$
$3d-1\frac{1}{4}''$	$7d-2\frac{1}{4}''$	$12d-3\frac{1}{4}''$	40d-5''
$4d-1\frac{1}{2}''$	$8d-2\frac{1}{2}''$	$16d-3\frac{1}{2}''$	$50d-5\frac{1}{2}''$
5d-13"	9d-23"	20d-4''	60d - 6''

Quick Method for Measuring Boards.

To measure boards 1" thick, multiply the length in feet by the width in inches and divide by 12, and the result will be the board measure in feet.

For boards $1\frac{1}{4}$ thick, add one-quarter of the quotient to the result as above.

For boards $1\frac{1}{2}$ " thick, add one-half of the quotient to the result as found above.

For planks 2" thick divide by 6 instead of 12.

The term "lumber" is applied to pieces not more than 4 inches thick, "timber" to pieces more than 4 inches thick, but a large amount taken together often goes by the general name of "lumber." A piece of lumber less than $1\frac{1}{2}$ " thick is called a "board" and a piece from $1\frac{1}{2}$ " to 4" thick is called a

Boards are sold at a certain price per hundred (C) feet or per thousand (M) feet, usually by the (M) feet.

Shop Bulletin No. 4, 1917.

The Speed of Circular Saws.

As a rule the rim of a circular saw should travel about 9,000 feet (nearly two miles) per minute. Saws differ in diameter, and in order to get the correct speed different revolutions must be made, a small saw traveling a greater number of revolutions per minute than a larger saw. A saw 12" in diameter is about 3 feet in circumference and must make 3,000 revolutions per minute in order to have the correct speed. If the speed of a saw is too high, the saw will not cut well, for it will heat and buckle and will not run thru. It is also very dangerous; on the other hand saws run at too low speed will not work well. The following table gives the speeds at which circular saws should be run:

S	at which circ	mar saws s	snould be run:
r	diameter of the	saw	Revolutions per minute
	(Inches)		$(Spee \hat{d})$
	8		4,500
	10		3,600
			3,000
	14		2,585
	16		2,222
	18		2,000
	20		1,800
	00		1 000

Size or

Rules for Calculating the Speed of Saws, Pulleys and Drums.

Problem 1. The diameter of the driver being given,

to find its number of revolutions.

Rule: Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driver; the quotient will be the number of revolutions of the driver.

Problem 2.The diameter and revolutions of the driver being given, to find the diameter of the driver, that shall make any given number of revolutions in the same time.

Rule: Multiply the diameter of the driver by its number of revolutions, and divide the product by the number of revolutions of the driver, the quotient will be its diameter.

Problem 3. To ascertain the size of the driver.

Rule: Multiply the diameter of the driver by the number of revolutions you wish it to make and divide the product by the revolutions of the driver, the quotient will be the size of the driver.

When the period is over put all the tools in their place before leaving the shop. "There is a place for everything, see that everything is in place." Do not make it necessary for the instructor to stop the class early to put tools away;

this is a loss of time for *yourself* only.

A great saving in material has been made since the last Bulletin was issued but there is still a great saving to be made. Use great care in cutting material in the stockroom and look in the scrap box first and see if there is any material there that will answer your purpose, but remember this material has not been paid for and you must pay for it when used.

Economical in the Use of All Material at All Times.

The term "Penny" as applied to nails.

The origin of the terms "six-penny," "ten-penny," etc., as applied to nails, the not commonly known, is involved in no mystery whatever. Nails have been made a certain number of pounds to the thousand for many years, and are still reckoned that way in England, a ten-penny being a thousand nails to ten pounds, a six-penny weighing a thousand nails to six pounds, a twenty-penny weighing twenty pounds to the thousand; and, in ordering, buyers call for the threepound, six-pound, or ten-pound variety, etc., until, by the Englishman's abbreviation of "pun" for "pound," the abbreviation has been made to stand for penny, instead of pound, as originally intended. The common sign for the term "penny" is "d," so that when we see 10d nails advertised this means 10-penny.

Length an	d Number	of Cut	Nails	to the	Pound

		-		or our	2 1 11110		ourra.	
Length	Com- mon	Fence	Finish- ing	Fine	Barrel	Casing	Brads	Size
3//					800			34
1''	800		1100	1100	376	* * *		2d
$1\frac{1}{4}''$	480		720	760	224			3d
$1\frac{1}{2}''$	288		523	368	180	398		4d
$2^{i'}$	168	84	268			224	126	6d
$2\frac{1}{2}^{\prime\prime}$	88	48	146			128	75	8d
3"	58	30	102			91	55	10d
3111	44	24	76			71	40	12d
$3\frac{1}{2}''$	34	20	62			54	27	16d
4"	23	16	54		1.1.1	40		20d

Estimating the Quantity of Nails.

		of Nails	Lbs.	Required
1000 shingles		4d		5
1000 laths		3d		7
1000 sq. ft. sheathing		8d		20
1000 sq. ft. sheathing		10d		
1000 sq. ft. flooring		8d		30
1000 sq. ft. flooring		10d		40
1000 sq. ft. studding		10d		
1000 sq. ft. studding		20d		
1000 sq. ft. finished flooring $\frac{7}{8}$ ".		8d to 10d	fin	20
1000 sq. ft. finished flooring $1\frac{1}{2}$.	10d fin		30

THE AMERICAN FEDERATION OF LABOR AND VOCATIONAL EDUCATION.

The latest annual report of the Commissioner of Education calls attention to the favorable attitude of organized labor with reference to the movement for vocational education, as represented by the chief executive officials of the American Federation of Labor. (Annual Report, 1916,

During the fiscal year covered by this report the American Federation of Labor has again emphasized its co-operation with the forces that are endeavoring to study the problems of vocational education, and to seek the organization everywhere of schools and courses of instruction that shall advance the best interests of all concerned, and that shall be based on sound principles of public policy.

Must Not Interfere With General Education.

There are two principles which are conceived by the officers of the Federation as of paramount importance:

The agitation for the reorganization of the publicschool system, in order to make it serve more efficiently the real needs of boys and girls and young people, must not be permitted to take the form of, or result in, a movement to diminish or abridge in any way existing opportunities for general education. The reorganization of the schools now in process of development, involving the introduction of various kinds of courses designed to meet the needs of all types of children, is believed to be progress in the right direction in the main.

Under existing conditions all children can not attend colleges and advanced technical schools, and become doctors and lawyers and engineers; consequently there is a real demand that the educational system shall recognize other legitimate and worthy aims besides those of preparing for colleges and the higher professions. Nevertheless, it is held, the newer types of courses that are developed in the attempt to meet these recognized needs must not presuppose any inevitable limitations upon the prospects of future advancement of the young people who avail themselves of the opportunities offered.

The representatives of labor properly maintain that the door of educational opportunity and advancement must always be kept open, and every individual should be permitted to progress just as far as personal ability and willingness to apply himself will carry him. In this view, vocational education is not to be thought of as a substitute for general education, but as a necessary part of it, or as supplementary to it. To every one should be vouchsafed the opportunity for a broad, all-round education that makes for complete manhood or womanhood, which should be supplemented by adequate preparation for a chosen occupation.

Public Unified Control.

(2) The second principle emphasized by the Federation has to do with the method of organizing and conducting vocational schools. The position taken is that whatever is attempted at public expense under the form of vocational education should be under public and not private control, and, further, that the control of all types of school supported by public taxation should be centered in a single authority responsible directly to the will of the people; that is, the local board of public school trustees in a city or town, and the state department of public instruction in a state.

In support of these contentions the following resolutions, as recommended by the Committee on Education, were adopted at the thirty-fifth annual convention of the American Federation of Labor, held at San Francisco, Cal., November 17, 1915: (Proceedings, American Federation of

Labor, San Francisco Convention, 1915; p. 323.)

"1. That in approving industrial education, equal attention should be given to the general educational studies and requirements of the school children. The convention believes the latter of greater importance to the future welfare of the worker than the former instruction.

That industrial education shall include the teaching of the sciences underlying the various industries and industrial pursuits being taught, their historic, economic, and social bearings.

"3. That all courses in industrial education shall be administered by the same board of education or trustees administering the general education; that no federal legislation on this subject shall receive the approval of the American Federation of Labor which does not require a unit system of control over all public school studies, general and industrial.'

The full report of the Committee on Education, as printed in the volume of proceedings of the 1915 convention, is of interest for its review of the attitude of the Federation toward vocational education in the past. As early as 1903 a special committee was appointed to consider what could be done to secure from the public schools "the sort of education needed to enable (the workers) to attain the greatest development of their own powers, the best co-ordination of mind and muscle, and to grow into the fullest and deepest appreciation of the meaning and possibilities of life." Other committees were appointed, and made reports, in subsequent years. At the 1909 convention President Samuel Gompers enunciated the principle that vocational education is a matter of national concern, and as such should be regarded not as a private but as a "public function to be controlled by the public and at public expense." In 1910 a preliminary report on industrial education was published by the Federation, and the final report, authorized at the 1912 convention, was later printed as a government document.

In view of these and other facts presented, the committee appropriately claims that there is abundant evidence that the American Federation of Labor "has consistently and unremittingly advocated the establishment of industrial and

vocational education in the public schools."

Equality of Educational Opportunity.

Further explanation of the point of view of the workers is given in an editorial by President Gompers, from which the following extract is taken: (American Federationist, February, 1916; page 126.)

"To assure every child equal free opportunities for the kind of education which meets his needs and talents is the only basis for genuine equality of opportunity—the only

condition upon which democracy will function.

"The old cultural ideals of education, dealing with the abstract only, denied to the great majority of children an education adapted to their minds and natures, and hence failed to fit them for the duties and possibilities of the work of life. There have come ideals of an education that teaches out of life and work; that deals with the concrete materials of environment and the duties and activities of life. This education seeks to put into the lives of all that understand, appreciation of the significance of service performed in all the relations of life—an appreciation that shall illuminate all of work and life.

Because the wage-earners have been taught by life that equal educational opportunities adapted to the needs of all are a condition requisite to equal economic opportunities, they have been foremost in pressing demands for the incorporation of industrial education and vocational training

as a part of our public-school system."

The interest of the Federation is not confined to problems of industrial education, as an examination of the report of the Committee on Education will show. Not only does the national body have a special committee for the broad study of educational problems, but states and local organizations have established similar committees. One of the recent instances of this action is that taken at the annual convention of the Wyoming State Federation, held at Casper, Wyo., July, 1916, at which time President H. W. Fox recommended and secured the appointment of a permanent Committee on Education.

During the past year the Federation has co-operated thru its representatives in important vocational education surveys and other investigations in the State of Indiana, in Minneapolis, Minn., and elsewhere. At a regular meeting of the National Executive Council, held in Washington, D. C., July 24, 1916, it was decided to recommend a study of the

so-called Gary system of public schools.

NEW JERSEY ASSOCIATION ORGANIZED.

The New Jersey Vocational and Arts Association held its organization meeting May 25 to 26, at Newark. The meeting, which was in charge of Mr. William R. Ward, was attended by about three hundred teachers.

At the afternoon session of the first day "Essential

Factors in the Preparation of Vocational, Manual Training, Home Economics and Art Teachers" were discussed by Wesley O'Leary, C. A. Burt, Miss Jean P. Case, and Miss Eva Struble. Mr. E. A. Reuther discussed "An Analysis of the New Course of Study;" Lewis H. Carris spoke on "The Application of the Federal Vocational Education Law to New Jersey," and J. A. Starkweather argued for "Methods and Standards in Supervision."

At the evening session, Mr. T. D. Sensor spoke on . "The Summer Schools, Their Work and the Training of

Practical Arts Teachers.

The morning of the second day was given up to group meetings and conferences and to a business session. Dr. E. B. Kent spoke at the Prevocational and Manual Training Section; Miss Mary Canfield at the Prevocational and Home Economics Section. At the session for Vocational Schools for Boys, Mr. F. E. Mathewson was in charge. Mr. Frank R. Flower acted as chairman of the woodworking section; Mr. H. D. Burghardt spoke at the metalworking section; Mr. J. E. Gaffney at the printing section; Mr. C. E. Parsil at the mechanical drawing section; Miss Bonnie Snow at the art section and George St. Thomas at the Boys' Industrial School. Mr. Charles H. Winslow gave a talk on "The Outlook for Industrial Education." A conference and luncheon was arranged for teachers employed in women's vocational schools and classes of the state.

At the business session, the following officers were elected: President, Frank E. Mathewson; vice-president, Hugo B. Froehlich; secretary, James E. Gaffney; treasurer, Clifford E. Parsil.

-R. A. Loomis.

NEW BOOKS.

The Home and Its Management.

By Mabel H. Kittredge. Cloth, 385 pages; illustrated. Price, \$1.50. The Century Company, New York.

This book reproduces the best present-day knowledge and practice in household management. It is really a work for the housewife and for the adult girl who is preparing herself for her duties as wife and mother. The author writes from the standpoint of a teacher of wide experience in conducting classes of women. There is much sound advice as well as accurate information on inexpensive furnishing, practical marketing, wise division of limited incomes, and best methods of cooking.

Direct Current Generators.

By Oscar Werwath. Cloth, octavo. 86 pages. Price, \$1.50. Electroforce Publishing Co., Milwaukee, Wis.

This is book seven of the School of Practical Electricity series which the author has developed as the result of ten years' experience in teaching electricians, electrical apprentices, and students of electrical engineering. The volume takes up in detail the various classes of direct current dynamos, dynamo efficiency, armature winding, and three wire generators. The work is fully illustrated and a comprehensive series of laboratory experiments and problems is included.

Household Arts and School Lunches.

By Alice C. Boughton. 171 pages; illustrated. Price, 25 cents. The Survey Committee of the Cleveland Founda-

tion, Cleveland, Ohio.

This report presents a rather bright picture of the household arts as taught in the Cleveland schools. As the first study of its kind in any city school survey it is rather significant in that it makes very clear the educational aims of the cooking and sewing courses both from the vocational and the social standpoint.

Essentials in Mechanical Drawing.

By L. J. Smith. Cloth, 57 pages. \$0.50. The Mac-

millan Co., New York.

This book, which is intended chiefly for students in agricultural schools, purposes to present the rudiments of plane drawing so that the users may be able to read ordinary drawings and be able to do simple mechanical sketching. The first part of the book outlines principles and conventions and the second offers eleven graded exercises.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Fumed Finish for Table.

674. Q.—I would like to give a table which I am making a light fumed finish and as I have not the facilities for fuming wood I would like to know if you could recommend a liquid stain which would imitate closely the fumed finish. I have experimented with Kleartone Light Fumed Acid Stain and also the Kleartone Dark Fumed Oil Stain, but neither seems to give that reddish tinge characteristic of the genuine rich fumed effect.

Would you also please suggest a suitable filler and the necessary steps for completing the finishing process?—C. M.S.

A.—First sponge the work thoroly with clear water to raise the grain and let dry in a warm room for five or six hours, after which sand with No. ½ sandpaper to a perfectly smooth surface. Brush on the stain either with a sponge or a rubber set brush, preferably one having a brass ferrule since the presence of any iron in contact with this solution or any solution containing tannic or pyrogallic acids, will produce black spots on the stained work.

Formula A.

1 01 1100000 11.
Pyrogallic acid $1\frac{1}{2}$ ounces
Carbonate of soda3 ounces
Water gallon
$Formula\ B.$
Sulphate of copper $\frac{1}{4}$ ounce
Water6 ounces
26° Ammonia

Dissolve the pyrogallic acid in one-half gallon of water and the carbonate in the remaining half gallon. Upon completion of the solutions, mix the two. Crush the copper sulphate and dissolve it in six ounces of warm water and when completely in solution, add the ammonia while stirring constantly. A white precipitate will at first be thrown down but it will subsequently be redissolved upon further addition of the ammonia to form the deep blue color characteristic of ammonia cal copper solutions. It may be necessary to add ammonia somewhat in excess of the formula given to produce this point of complete solution. Now mix solution A and B in a glass, granite or earthen vessel. (If the color is too dark, it can be reduced by the further addition of water. The color should not be judged, however, until the stain is completely dried and has been coated with orange shellac, reduced at least one-half with alcohol.) The piece should be sanded with 00 paper when perfectly dry and hard and rubbed with a cloth containing a slight amount of oil polish. If this color is not dark enough proportionately increase the pyrogallic acid and soda.

Another tone of color can be produced by oiling the work, after the stain has dried, with raw linseed, one pint; turpentine, one pint; dark japan drier, 1 tablespoon; the whole thoroly mixed together before using. On some kinds of oak, especially on sap streaks, the addition of a small amount of asphaltum varnish to this oil will considerably heighten the effect and give enough color to the sap streaks to enable their being shaded out. After the work is oiled off, it should be allowed 24 hours to dry and then should be coated with a thin coat of orange shellac as mentioned above. When this shellac is dried hard, sand perfectly smooth, dust off and then

coat with flat varnish, well brushed out.

I wish at this time to correct what seems to be a rather prevalent idea among schoolmen and others outside of the trade, regarding the use of filler on fumed oak. If one desires to produce a standard article or imitate a standard, one must use standard practice. In standard practice fumed oak is not filled nor is it polished with a polishing varnish. An entirely different effect is produced thru the use of brown filler and a rubbing or polishing varnish. This color while rich and full of life is not fumed oak in the term adopted as standard by the Grand Rapids Furniture Manufacturers'

Association. It might be well to note, however, that by fuming oak, shellacing and by filling with different colors, as for instance, light olive green, dark rose pink, or burnt sienna, followed by several coats of good varnish, rubbed to a perfect surface after drying, beautiful results can be obtained. While such combinations may seem somewhat odd, yet when carefully done they are capable of producing extremely rich results.—Ralph G. Waring.

Staining Walnut.

687. Q.—Some time ago you gave a formula for finishing Walnut (Potassium Permanganate 1 oz. and Epsom salts 1 oz.) You advocated always sponging with clear water to raise the grain, and sand when dry with 00 paper.

Should the Walnut be sponged with hot or cold water, and is it done so that the stain will penetrate deeper, or to obviate the necessity of sanding after the stain be applied?

How should the sap be shaded out on the large bulb of

a table leg turned out of American Walnut?—A. N. D.
A.—The process of sponging wood previous to staining has a number of advantages, chief among which are the following: First, the action of the water, which should preferably be cold, raises the grain of the wood so that after subsequent drying this raised material may be leveled off with sandpaper and thus do away with its recurrence upon application of the stain coats. Hot water should not be used on veneer work since it is very apt to strike thru the thin surface material and loosen the glue binding on the cross banding. As a general proposition, it is best to play safe and use cold water. It is hardly practicable to go to the trouble to heat much water for this work. In a case which has recently come to my attention a contractor inadvertently spoiled several hundred dollars' worth of fine doors thru the use of hot water.

The second advantage of the sponging lies in the fact that this method opens up all the pores in the wood, relieves them of the clogged condition from previous sandpapering and so enables the staining material to be drawn deeply into the wood, thereby producing a much more even color, capable of withstanding light sanding with fine sandpaper if such should be necessary to produce that perfect smoothness of wood surface upon which the subsequent varnish coats de-

pend for their beauty.

The last big advantage is also the result of the opening of the pores. This part has to deal with the use of filler previous to varnishing. If the wood is allowed to be filled without sponging and sandpapering previous to staining the old sandpaper dust and other material which clogs the pores will absorb water from the stain and remain in a condition considerably more damp than that portion of the wood in direct contact with the air. When filling is now attempted upon such a foundation this material in the pores subsequently dries out thru the absorption of the water by the surrounding wood with the result that a shrinkage and settling develops resulting in the pulling of the varnish coat down into the pores. On the other hand, this same moist condition in the pores of the wood may result in the varnish being forced out in small spots due to the expansion of the moisture in case the varnish work is being done in an excessively warm room. It is good policy then to take no chances thru short cuts not founded on commonsense practice but to adhere to methods which have borne the test of time and experience.

In regard to the shading of sap walnut on turned work or other material containing sap streaks, the entire piece should be stained with the permanganate of potash and Epsom salts stain as follows: To one gallon of boiling water add one ounce of potassium permangante and one ounce of Epsom salts. Sponge on this solution while hot, let dry and Those portions of the wood in direct contact with the sap streak should be brushed with benzine or gasoline and the sap streak itself should be touched up with a

solution of turpentine, benzol and enough high grade asphaltum varnish to form a strong tint. In using this material, a long haired bristle brush which has been cut diagonally in the form of a skew chisel should be used to apply the stain, taking care to have the long bristles pointing in the direction of the nearest heavy color. The use of gasoline here mentioned enables one to obtain the wet color of the wood in contact with the sap streak and thereby offers the best method of getting the sap streak dark enough and it also prevents the color striking into the heart wood and forming an objectionably dark line.—Ralph G. Waring.

Finishing Small Turned Work.

677. Q.—I am about to finish some gavel heads of maple, cherry and walnut glued together. Previously I have always used shellac to finish these gavel heads, but have had trouble because of streaks that appeared. Can you suggest a rubbed or other finish that will be permanent and will bring out the contrast of the natural wood colors?

I would also appreciate a good finish for soft wood as

white pine used in wood turning.—C. G. M.

A.—In the case of small turnings it is desirable to do as much polishing as possible in the lathe where speed and heat can be developed. For this reason, I am suggesting that the questioner blind bore his gavel heads by boring the proper size hole and avoid coming out on the far side of the head by half an inch. If he will then turn his handles so that the portion to be fitted into the head will make a running fit, the handle need not be inserted until the head has been polished. I would further suggest that he saw this blind end of the handle lengthwise for one inch and insert a hard wood wedge, the heel of which is one-eighth of an inch in thickness. If a very small amount of glue is put into the socket the wedge inserted in the handle, and the latter driven lightly into the head, this combination will produce a joint quite impossible to break. Now that the method of assembling is covered the polishing can be considered.

The mallet should be left in the lathe with the chuck and tail piece blocks still left on the gavel head with but a quarter of an inch of material still to be cut with the parting tool. If these blocks are from material that has been squared they will enable the operator to better his method of boring for the handle which should be done at this time. After boring, the piece should be again inserted in the lathe and speeded up as high as possible. The polish made from the following formula should then be applied with a woolen cloth and burnished with piece of soft felt which should be cleaned between usage with alcohol and gasoline in separate washings.

The formula is:

Shred one ounce of yellow beeswax and add heated turpentine to make a thick paste. When this is completely emulsified stir in slowly a solution of one ounce of gum sandarac dissolved in one gill of alcohol and filtered.

The handle can be polished in the same manner and, when the operation is complete, the blocks are removed with the parting tool, and the small spot remaining touched up with the polishing cloth. The glue should then be carefully dropped into the socket of the gavel, the handle with its wedge driven home, being careful not to drive so hard or so

far as to split the head.

In case the questioner desires, he can give these gavels one or two coats of good varnish which, after having dried for a week, will allow the head to be polished in the lathe by holding the polishing felt against the revolving block. The felt should be lightly covered with FF pumice stone and water. When the varnish is perfectly smooth, the work may be polished by using another piece of felt to which has been added a small quantity of the following mixture: To one pint of vinegar, add one quarter pound of rotten stone and two tablespoonsful of 3-in-1 oil. This should be well shaken before using.

If the formula for the brown asphaltum stain (see question 676) be used on white pine turnings, a good color will be produced which, when dried, may be polished as

given for the gavel heads.—R. G. Waring.

Air-Drying Lumber.

678. Q.—I have several small pieces of lumber taken from the trunk of a rare tree and should like to know of a way to season it to make sure of no checking.—H. E. B.

A.—The data which the correspondent has furnished is extremely indefinite. For instance he does not say that the wood is a pine or soft wood, some native hard wood or a foreign import. Neither does he say whether he has any dry kiln facilities at hand. As there are several classes of woods and as each requires different kiln treatment, I have no information at hand which will enable me to suggest a method of drying this wood in a dry kiln.

On the other hand he may use the following method of air drying which I have found practical in my own work where I am constantly collecting odd or heavily figured woods for use in serving trays or similar pieces. His material should be resawed if necessary to whatever desired thickness, making an allowance of one-eighth of an inch in thickness for dressing to finished dimensions. He should now prepare a number of stickers, ripped from one board so as to insure even thickness, an inch and a half in width and of whatever length is necessary to cross the width of the board. These stickers should be placed on the floor, one foot apart and the first board laid on top. On top of this another set of stickers should be placed directly over those beneath. This process should be continued until the lumber is completely stuck and all stickers absolutely straight across the boards and each directly over the one below. The piles should now be clamped tightly to insure the removal of any twist in these boards and at the same time to enable the ends of the stickers being nailed securely to a heavy cleat which will insure their being kept in place after the clamps have been removed. It is advisable that the end stickers be flush with the ends of the boards. The actual drying should be governed in the following manner:

I would suggest that the boards at first be placed in a warm (65–70 F.) room, preferably one which is not too dry, as for instance a well lighted cellar. At the end of a month these boards may be removed to a warm but drier room such as a well lighted and ventilated shop. The boards may remain here approximately four months, at the end of which time they can be placed where there is plenty of dry heat of not too great intensity as some portion of the boiler room away from any escaping moisture or steam. I have found this practice to be very acceptable where I was not in too great a hurry for material and where conditions were not suitable for rapidly drying it in a kiln. Such material when resawed or dressed has worked up quite satisfactorily.

If your correspondent has enough of this material to

If your correspondent has enough of this material to be worth while, I would suggest that he get in touch with Mr. H. D. Tieman, Forest Products Laboratory, Madison, Wis., where he is operating an experimental kiln of the most

highly developed type.—Ralph G. Waring.

Removing Spots from Fumed Veneer.

686. Q.—How is it possible to remedy spots on a fumed table which has only a veneer of quartered oak? The table was waxed.—C. P. W.

A.—Make up a pad of clean burlap. Saturate the same with denatured alcohol and with this remove any wax or shellac with which the table has been coated. It may be necessary to repeat this treatment several times. Care should be exercised to see that an even color results from this treatment. To remedy the lightness of the heated spots, prepare a mixture of asphaltum and benzole or acetone. With a pad of muslin or soft haired brush, touch up these light spots with this mixture, which should be made fairly thin, about the consistency of milk. Let these retouched spots dry over night, then with a wide brush and the asphaltum mixture reduced to the consistency of water, give the whole top a thin and very even coat, being careful to see that the staining is carried in wide strips with the grain of the wood across the table. Take care to see that the brush movement is from the untreated toward the stained work. In this manner laps and streaks may be avoided. Let this stained work dry 24 hours and follow with a coat of orange shellac reduced one-half with alcohol. When this has dried for three hours, sand lightly with 00 paper and coat with two coats of good varnish, allowing three days between coats.

From past experience, I judge that this will be a satisfactory remedy for the trouble caused thru the use of Pyrex ware.—Ralph G. Waring.